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The Journal

OF

Nervous and Mental Disease

AN AMERICAN JOURNAL OF NEUROPSYCHIATRY

FOUNDED IN 1874

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ORIGINAL CONTRIBUTIONS

	PAGE
The Comparative Method in Psychiatry. By William A. White, M.D.	1
Dysostosis Cleidocranialis with Metabolic Disturbances. By Knud H. Krabbe, M.D.	18
The Sex Life of College Men. By Martin W. Peck, M.D.	31
A Case of Periodic Paralysis Associated with Thyroid Enlargement. By A. S. Maclaire, M.D.	44
The Significance of the Frontal Brain with Respect to the Higher Psychic Functions. By Julius Donath, M.D.	113
Organic Epilepsy Considered from the Standpoint of Cerebral Localizations. By Alfred Gordon, M.D.	142
Remarks on the Correlation of Psychological and Physical Symptoms in the Psychoneuroses. By Sanger Brown, 2d, M.D.	161
Extra-Pyramidal Hemiplegia (An Analysis of a Case with "Forced Attitude" or Zwangsstellung). By L. Grimberg, M.D.	167
Remarks on the Pathological Alterations of the Cortex Caused by Psychoses. By Professor Dr. Otto Marburg.	225
Cardiac Neurosis in the Light of Modern Cardiology. By Louis Faugeres Bishop, A.M., M.D., Sc.D., F.A.C.P.	232
The Significance of Psychopathology for General Somatic Pathology. By William A. White, M.D.	246
Some Reflections on Muscle Tonus. By Isador Abrahamson, M.D.	337
The Present Status of the Malarial Inoculation Treatment for General Paresis. By Nolan D. C. Lewis, M.D.	344
A Study of Memory Deterioration in Encephalitis Lethargica. By Grace L. Bebb, M.A.	356
The Experimental Study of the Romberg Sign. By Franklin Smith Fearing	449
Huntington's Chorea in a Twin Child Case Report. By Newdigate W. Owensby, M.D.	466
Malignant Spheno-occipital Chordoma. By John L. Eckel, M.D., and Wm. F. Jacobs, M.D.	471

Bdy 3 vol

Somatic Pathology and Psychopathology at the Encephalitis Crossroad: A Fragment. By Smith Ely Jelliffe, M.D.....	561
On the Nature of Abdominal Reflexes. By M. Astwazaturow, M.D.	587
Extensive Brain Hemorrhage. By N. W. Winkelman, M.D., and John L. Eckel, M.D.....	593

Society Proceedings:

New York Neurological Society....	49, 177, 270, 366, 487, 603
Boston Society of Psychiatry and Neurology.....	283, 499

Current Literature:

Vegetative Neurology.....	75, 192, 292, 383, 514, 615
Sensori-Motor Neurology.....	84, 199, 304, 403, 526, 626
Symbolic Neurology.....	92, 204, 314, 427, 539, 640

Book Reviews.....	98, 210, 328, 439, 549, 655
--------------------------	-----------------------------

Obituaries:

Arnold Pick	109
Henry Hun	216
Walter E. Fernald.....	219
John Irvine Hunter.....	336

Notes and News.....	223, 560
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The Journal OF Nervous and Mental Disease

An American Journal of Neuropsychiatry, Founded in 1874

ORIGINAL ARTICLES

THE COMPARATIVE METHOD IN PSYCHIATRY

BY WILLIAM A. WHITE, M.D.

OF WASHINGTON, D. C.

Psychiatry is, of course, not a science. It is a department of medicine and as such its dominant note is practice, or more specifically treatment. Its subject matter is the diseases of the mind. Psychiatry is, therefore, that department of the practice of medicine that deals with the treatment of mental diseases. I have used the word treatment alone in defining the function of psychiatry rather than attempt to include such other notions as are expressed by knowledge of causes, course, pathology, etc., because all of these are secondary and contributory to treatment. Psychiatry is, therefore, like medicine in general, an art rather than a science, and like general medicine an art which attempts to utilize the material of many sciences. The principle sciences which are called upon by the practice of medicine are anatomy, physiology, and chemistry, particularly human anatomy, human physiology and human chemistry, and certain aspects of certain other biological sciences in their specific human applications such as embryology, bacteriology, and heredity. Most important and specific in its contribution is that department of anatomy that deals with the structure of the diseased body, pathology, and especially the pathology of the tissues, histopathology. In psychiatry the relation of practice to the various sciences is quite similar except that psychology needs to be added. The organic pathology that is most important for psychiatry is naturally the pathology of the nervous system, neuropathology, while it is the department of psychology that deals with abnormal mental conditions, namely, psychopathology,

that makes the most specific contribution and is the science that is most characteristic of psychiatry.

All this is descriptive of psychiatry, as it is generally thought of, as it has been in the past, and, for the most part, as it is to-day. Psychiatry as a body of scientific facts or, more especially, that part of psychiatry that consists of the scientific facts upon which treatment is based, particularly pathology in general and psychopathology in particular, is still largely in the descriptive stage of development. All science must go through the stage of collecting, describing, and classifying its material, and for the most part psychiatry rests there. The interpretative stage of science must naturally come later. Now science attempts to "explain" its facts, that is, it attempts to tell *how* they have come to pass.¹

This explanation by science of the *how* of events was enormously facilitated by the theory of evolution which introduced the fundamental conception that every event grew out of the events of the past and in its turn was doing its part in bringing about the events of the future. Every event or thing, every animal or plant, human institution, belief, or custom must have had its history, which, if it could be known, would furnish a complete explanation for its present state of being. In the same way, if the present could be fully known the future could be predicted. Put in other words, this is the principle of "efficient causation" that assumes that every event is in some way contained in the preceding events, or more specifically, in those events that invariably, that is, of necessity, precede it.

This feeling that nature is a constantly evolving system in which any given state of affairs can only be explained by its historical past has given a great impetus to any latent tendency to compare the similar and to differentiate the dissimilar. This perception of similarities is a process which is part and parcel of the development and evolution of thought, but when it was made conscious it became then in large part the groundwork of the comparative method in science.

The comparative method is employed just so soon as the explanation of an event is sought by means of observations of similar or related events. The ideal laboratory experiment seeks to vary one factor in the situation while keeping all the others constant. Any change in the final result can therefore be traced to the factor that has been varied. In nature that cannot be done. The comparative method, however, is an approximation to the laboratory ideal. By

¹ Hobson, E. W. The Domain of Natural Sciences.

observation of many similar situations it can often be seen how variations in one series of events is accompanied by variations in another series. When this is found to be the case, and especially when it is further found that this relationship is invariable, when one series of events always precedes and the other follows, and when, in addition, the relation is a quantitative one, that is, the greater the former the greater the latter, the dependence of the one series upon the other is fairly evident and we are justified in assuming a relationship of cause and effect.

This is a description of what I conceive to be the essentials of the comparative method as a way of thinking, as a process of arriving at results. As a matter of fact, we are familiar with the comparative method not only as a process but as having a certain content. I mean by this that we are familiar with the fact that in the biological sciences these comparisons are characteristically made as between different species of living forms; between forms of life occupying different positions on the phylogenetic tree, that is, often between living and fossil forms; and between the different stages of development of the same form. The sciences that have developed along these lines are particularly anatomy, morphology, and embryology, but all the sciences, including the mental and social sciences and religion, have to use the comparative method.

Much of our common scientific knowledge, particularly in the field of the biological sciences, is the result of the use of the comparative method. For example, we might examine a particular specimen of a human appendix or the gill slits of a particular human embryo everlastingly without even suspecting what they were, their meaning, or how they came to be. It is only the comparative method that is competent to clear up the riddle.

The comparative method has lately been coming into recognition in fields more or less closely related to psychiatry. I have particularly in mind in the field of neuroanatomy the work of Kappers and his theory of neurobiotaxis.² This theory was developed to account for the position of the nuclei of the medulla as a result of the comparative study of their locations in a wide variety of animals (lamprey, shark, fish, amphibian, reptile, bird, mammal); and in the field of neuropathology the work of Brouwer,³ who demonstrated that certain

² Kappers, C. U. A. Phenomena of Neurobiotaxis as Demonstrated by the Position of the Motor Nuclei of the Oblongata. *JOUR. NERV. AND MENT. DIS.*, Vol. 50, No. 1, July, 1919.

³ Brouwer, B. The Significance of Phylogenetic and Ontogenetic Studies for the Neuropathologist. *JOUR. NERV. AND MENT. DIS.*, Vol. 51, No. 2, February, 1920.

symptoms of multiple sclerosis and of various types of paralysis can be explained on the general principle that it is the younger portions of the nervous system that are more vulnerable to noxious agents. The existence of certain symptoms and their presence rather than others, for example, the loss of the abdominal and not the knee reflex in multiple sclerosis, receive their explanation when the relative age of the affected parts is determined, and this quite obviously requires the comparative method of inquiry.

The comparative method has also been coming to the fore in the study of the functions of the central nervous system. The laboratory experimentation in the production and study of decerebrate rigidity⁴ can be viewed as an attempt to uncover the functions of certain phylogenetically older portions of the central nervous system by experimentally cutting off the influences that normally modify them from higher and more recently developed regions. A recent attempt at an explanation of the epileptic convulsion⁵ is along the same lines. Rosett believes that the higher centers are temporarily out of commission, and this state of affairs, that I think might well be called functional decerebration, releases the lower centers from the inhibitory control normally exercised from above, and that the convulsion can be largely explained as the result of this release. Hunt's work on the functions of the corpus striatum⁶ also belongs in the category of recent research in the functions of the central nervous system with the use of the comparative method.

Much more might be said along the same lines, but enough has been offered to show that the comparative method has been working its way quite definitely into the nearby territory of psychiatry. Let us now turn to more definite psychological regions. In the first place, psychology itself has only lately been rescued from the traditions of medievalism and come into recognition as a biological science in the true sense of the term. In fact, it still carries some of the flavor of its long association with metaphysics and philosophy. Nevertheless psychology has long recognized the value of the comparative method, as witness genetic psychology and animal psychology. When we come to that application of psychology to the field of psychiatry, that section of natural science that is most characteristic of the scientific

⁴ Walshe, F. M. R. The Decerebrate Rigidity of Sherrington in Man. *Am. Arch. Neurol. and Psychiat.*, Vol. 10, July, 1923.

⁵ Rosett, J. The Mechanism and the Fundamental Cause of the Epilepsies. *Am. Arch. Neurol. and Psychiat.*, Vol. 9, June, 1923.

⁶ Hunt, J. R. Primary Atrophy of the Pallidal System of the Corpus Striatum. *Arch. Internat. Med.*, Vol. XXII, November, 1918. Progressive Atrophy of the Globus Pallidus. *Trans. Am. Neurol. Assn.*, 1917. The Static and Kinetic Systems of Motility. *Trans. Am. Neurol. Assn.*, 1920.

armamentarium of psychiatry, namely, psychopathology, the story is somewhat different. Here the recognition has been slow to come about, and as a matter of fact most of the psychopathological work of the present is still engaged in description and classification. It remained for the psychoanalysts to insist upon the necessity of a historical study of the symptom.

More recently, however, largely as the result of the impetus of the psychoanalytic movement, without doubt, the historical method has come into play more and more in the consideration of psychopathological symptoms. In fact, there is a considerable body of thought growing up about the attempt to interpret the symptoms of the psychoses that recognizes, more or less fully, the comparative method as a valuable and necessary way of approach to their understanding.

An analogy at this point may not be out of place. The basic sciences upon which psychiatry draws are psychology as over against anatomy and physiology, and psychopathology as against pathology. Psychology includes both the structure and functions of the mind quite as do the combined sciences of anatomy and physiology deal with the structure and functions of the body, only in the realm of psychology structure is referred to as content and function as process. The content of thought and the process of thinking are the usual expressions for this differentiation.

With this analogy in mind I would draw another parallel between the progress of thought in the fields of general neuropathology and psychopathology. In the past interest has been preponderantly centered about the content of thought rather than its process, and upon the sensory or perceptual aspect of the psyche rather than upon the motor, emissive, or expressive side. The motor aspect of the central nervous organs, and particularly of the psyche, have received scant attention except in so far as they have related to the pyramidal tract system and the spinal and cranial motor nerve pathways. These more recent acquisitions to the nervous apparatus have been almost all that have been known until quite recently. All this is being rapidly changed now, as witness the work of Hunt,⁷ already referred to, and the recent monumental work of Jacob⁸ on the extrapyramidal disorders of motility. In quite as complete a way have the motor manifestations of mental illness been overlooked and the emphasis of interpretation been placed upon the explanation of the delusion and of sensory falsifications. Content of thought has attracted the

⁷ Loc. cit.

⁸ Jacob, A. *Die extrapyramidalen Erkrankungen*. Springer, Berlin, 1924.

almost exclusive attention of the investigator, while the process has gone largely unheeded: the ideational and perceptual aspects of thought have commanded much more attention than the emissive aspects and the end products as expressed in muscular motions, attitudes, visceral tonicities and glandular secretions. These latter aspects were particularly emphasized by Kempf,⁹ and more recently, in a way which brings them in line for study after the comparative method, by Storch.¹⁰

The only set of motor adjustments that have been carefully studied for any length of time, more particularly by the comparative method, are those habitual activities which are comprised in language. Comparative philology is approximately a century old.¹¹

While words may be defined as habitual acts which have for their purpose the conveying of an idea to another person, language as the totality of such acts can only be understood as an expression of man as a social animal. While it is true, therefore, that language has its individual aspects, it has what are perhaps more important, its social aspects, and while, as Jenisch says, "in language the whole intellectual and moral essence of a man is to some extent revealed," it is also true that, as Sherer says of the work of the Grimms, that philology in their hands became a pattern for "comparative investigation of the entire life of mankind."

As a Danish philosopher has well said, "in his whole life man achieves nothing so great or so wonderful as what he achieved when he learned to talk." It will be valuable for us, therefore, if we can see whether the language which is learned by the child, passed on to him in large part by the adults, from the two aspects of the child's own contributions and racial traditions which are incorporated in that which is transmitted, conforms to the general formula which I have already laid down. In the first place, the method of classifying objects by children illustrates the crude way in which analogies are used to associate what we conceive to be widely different objects. A little girl divided the animal kingdom into two groups: first, horses, including all four-footed animals, even a tortoise, and second, fishes, including all that moved without the use of feet, for example, birds and flies. This is a perfectly characteristic method of classification whereby a single element that is common is held sufficient to bind

⁹ Kempf, E. J. *Psychopathology*. Mosby, St. Louis.

¹⁰ Storch, A. *The Primitive Archaic Forms of Inner Experiences and Thoughts in Schizophrenia*. Nervous and Mental Disease Monograph Series, No. 36. New York and Washington.

¹¹ The examples from language here cited are, unless otherwise specified, from Jespersen, O.: *Language*, published by Henry Holt & Co., 1924.

together a group of what we would consider exceedingly diverse objects. Another example is that of a boy who, having had a pig drawn for him, the name "pig" was used not only for a pig but for drawing a pig, and for writing in general. Such similarities when spread out in time produce interesting results as they are handed on from generation to generation. Jespersen gives the example of the word *Tripes*. It originally meant three-legged stool, then came to mean the man who sat on a three-legged stool and disputed for his degrees at Cambridge. Then as this Mr. Tripes had to provide comic verses these were known as "Tripes verses" and came to be printed under that name long after Mr. Tripes himself had disappeared. Then, inasmuch as the examination list was printed on the back of these verses, it was called the Tripes list, and Tripes had now come to mean the examination itself.

It is interesting in passing to note that one of the results that is apparently brought about largely by this way of thinking is the confusion of ambivalent opposites.¹² One little girl says, "This is where we sat next time," and similarly the Gothic word which corresponds to "yesterday" means "to-morrow." The distinction in Chinese between such opposite meanings as *acquired* and *give*, *buy* and *sell*, are only made by tone.

The instances are very numerous among the savage races where a concrete expression is used where we would use a more abstract one. This is perhaps the most characteristic difference between child and adult language on the one hand and primitive and civilized language on the other. Typical instances in point occur in various languages of such a character as, for example, the inability to express such abstract ideas as father, mother, head, or eye separately. They can only be expressed in connection with an indication of whose father, mother, head, or eye is being spoken of. The phenomena of concord by which is meant that a secondary word such as an adjective or a verb must agree with the primary word, substantive or subject, to which it belongs, is one of the instances in which this exceeding concreteness of primitive language works itself out into what for us would be extreme confusion. This is illustrated by what we call the "concord of negatives" in old English whereby there were various forms of negatives which have been preserved in the vulgar speech of modern times in such words as "niver," "nobody," "nothin'," whereas in good English a single negative *no* is sufficient. The

¹²For some further excellent examples of ambivalency in language see Joe Tom Sun: Symbolism in the Sumerian Written Language. The Psychoanalytic Review, July, 1924.

abstract idea of negation has replaced the multiplicity of concrete negatives. For instance, in Bantu a sentence which is based upon the word *man* in the singular is a very different looking affair from the same sentence based upon the word *man* in the plural—*men*. In the same way such words as country, nation, girl, are entirely different words in the singular and the plural, whereas for the most part we have developed a simple suffix, *s*, which we add to words to indicate the idea of plurality; similarly for the possessive case and in the matter of gender. Father and mother, man and wife, bull and cow, belong to the more primitive concrete type of differentiation, while more abstract later forms are illustrated by count and countess, he-bear and she-bear. Other examples of irregular and regular forms which have a similar explanation are met with in degrees of comparison, such as good, better, ill, worse, as over against regular forms like happy, happier, big, bigger, while in the matter of verbal flexion such forms as *am*, *is*, *was*, *been*, are again in striking contrast to more modernly developed forms which depend upon adding a mere ending and leaving the body of the word unchanged. Jespersen sums up his law of development in the following definition: "The evolution of language shows a progressive tendency from inseparable, irregular conglomerations to freely and regularly combinable short elements." The examples that have been given all illustrate this change, both in ontogeny and philogeny, and as expressed in this definition the change can be seen to conform to the well-known law of economy.

Some further examples of the vocabulary of primitive people may be illuminating as showing how the more advanced a language is the greater is its power of expressing abstract ideas and, *vice versa*, the more primitive it is the more concrete are its expressions. The Tasmanian Aborigines, for example, had no words for abstract ideas. They possessed a name, for example, for each variety of gum tree and wattle tree, but they had no word for tree; neither had they any expression for such abstract qualities as hard, soft, warm, cold, long, short, round. The Mohicans have words for cutting various objects, but no word that means simply cutting. The Zulus have words for red cow, white cow, etc., but no word for cow. In Central Brazil the natives have a word for each parrot, but the general idea parrot has no corresponding term. It is the same with the idea *palm*. Many languages have no word for brother, but words for elder brother and younger brother. In Cherokee there is no word for washing, but different words which mean "I wash myself," "I wash my head,"

"I wash the head of somebody else," "I wash my face," "I wash the face of somebody else," "I wash my hands or feet," "I wash my clothes," "I wash dishes," "I wash a child," "I wash meat." The Melanesians have special words to denote a definite number of certain objects, thus ten cocoanuts, ten canoes, and ten fishes would each be expressed by different words. In other languages the numerals are the same for all classes, but require after them certain class-denoting words varying according to the character of the objects. This is in some respects comparable to the English *head* of cattle, and reminds one of the use in England of stone and ton in accordance with the nature of the thing weighed or measured. This nomenclature is easily seen to be concretistic in origin, such as horse, mare, stallion, foal, colt, instead of he-horse, she-horse, young-horse, etc., and the use of different terms for what is essentially the same idea, as a flock of sheep, a pack of wolves, a herd of cattle, a bevy of larks, a covey of partridges, a shoal of fish.

Feelings, emotions, instincts, were the first things that sought expression, not thoughts and ideas and intellectual formulations. Of all these emotions, it is interesting to note that a philologist of Jespersen's standing thinks the most powerful must have been love. He believes "language was born in the courting days of mankind."

In the development of language, therefore, from concrete to abstract possibilities, and from the long, complicated conglomerations of words which are obliged to bear relations to one another in accordance with the principle of concord, we find language has developed much as writing has. Writing was first primitive picture writing, each sign meaning a whole sentence or more, then idiographic writing of each word by itself, succeeded by syllabic writing, and finally by alphabetic writing. The tendency to analysis is well indicated by this progression, for the further back we go the more it is seen that the sentence is the original indissoluble whole which has not yet been separated even into single words.

The history of thought as exemplified in the ways of thinking of the savage and of the child illustrate these principles.¹³ This history shows a change from relative simplicity toward an ever increasing complexity and differentiation. The change, as described by Storch,¹⁴ is from *feeling*, *concreteness*, and *perception* in the direction of *reasoning*, *differentiation*, and *abstraction*. I will illustrate.

Our idea of number is extremely abstract, that is, number as such

¹³ White, Wm. A. *An Introduction to the Study of the Mind*. Nerv. and Mental Monog. Ser., No. 38.

¹⁴ Loc. cit.

has been separated, abstracted from its relation with any particular object or group of objects, and exists as an abstract conception in itself. With the savage, however, the condition is quite otherwise. The Malay, for example, uses the word *lima*, which once meant hand, to express the number five. Similarly the Sanscrit word *pentscha* means hand. The implication is plain. Man began to count by using his hands and fingers. Then with the Tamanacs of the Orinoco¹⁵ the term for five means the "whole hand"; for six, "one of the other hand"; for ten, "both hands"; for eleven, "one to the foot"; for fifteen, the "whole foot"; for sixteen, "one of the other foot"; and for twenty, "one man." Note how concrete is the way of thinking as expressed in such language. One can almost reproduce the visual image of the actual process of tallying on the fingers and toes from these expressions of the different numerals. The thinking is concrete; it includes the actual situation as perceived in all its details; it is perceptual and undifferentiated. Number as an abstraction has not yet appeared. The exceeding concreteness and perceptual character of this kind of thinking is well illustrated by the fact that for savages three boats of one tribe and two boats of another tribe are five boats only under certain circumstances, as when the two tribes have undertaken an expedition in concert.¹⁶ The number is here seen to be a structural feature of the actual, concrete, perceived situation. Traces of this way of counting are still to be found in our present language. Counting by fives is the savage way. We do not use words to count this way, but we still do count this way nevertheless when we use the Roman numerals. Counting by tens, the decimal system, is our usual way, while counting by twenties is still preserved in such expressions as "four-score" and in the French "*quatre-vingt*."

Just as the savage's thinking in numbers shows the qualities of relative simplicity and lack of differentiation, so does his thinking in other respects. He is quite as vague about his environment, about himself, and about the relations of the two.¹⁷ The woods and streams, the air and the heavens are filled with spirits, with characters like his own, and they and his fellows are capable of influencing him in all sorts of magic ways. The arrow that has wounded him is treated and kept cool instead of the wound; his name is a part of himself as much as his hand, and each time it passes his lips he parts with a vital part of himself; he and his tribe are dependent upon the

¹⁵ Tylor. *Anthropology*.

¹⁶ Storch. *Loc. cit.*

¹⁷ White. *Individuality and Introversion*.

health of the chief, and should his health fail the tribe is in danger; a childless woman puts on the robe of a woman who has borne children and thus acquires her fruitfulness; he does not differentiate past, present, and future; he believes that a sorcerer can produce a given effect by merely thinking it, so that evil may be produced by simply wishing it.¹⁸

Just as the thinking of primitive man is relatively simple and undifferentiated as compared with his adult descendant, so the thinking of the child has the same qualities as compared with the thinking of the adult. Like the savage, the distinction between him and his environment, between the "I" and the "not I," is blurred and indistinct, and he passes through a stage of development which is analogous to the stage of animism of primitive peoples, when, like them, he peoples his surroundings with spirits or demons with natures like his own. The fear of ghosts and the superstitions of children and savages are quite similar and dependent upon the same processes of thought, the same mental mechanisms.

The world of the child, like that of the savage, is exceedingly concrete and perceptual; things are seen and apprehended in the situation in which they happen to be met. For example, a five-year-old girl, in answer to the question, "What is a wagon?" said, "Men get in, one gives the horse a blow with the whip, and then the horse runs."¹⁹ The situation in which the wagon has been perceived constitutes a whole; wagon as a separate object has not been abstracted from the concrete, perceptual experience.

What are the applications of this comparative way of looking at the human organism to the problems of psychopathology? We are coming to an understanding of man in his physical and his personality make-up and in his social relations by a study of and an understanding of his past; by an interpretation of what he *is* by a knowledge of what he *has been*; an explanation of the *present* in terms of the factors that have been found operative in a study of his *past*.

It will be worth while to see how these principles apply to a specific problem of psychopathology. I will choose the problem of dementia precox (schizophrenia) because these ways of thinking have already been applied to this problem and we can note with what results. Then again schizophrenia may properly, I think, be thought of as the major problem of psychiatry to-day, not only because it includes the largest percentage of institutionalized subjects and therefore is major from

¹⁸ Lévy-Bruhl. *Primitive Mentality*. Macmillan Company, New York, 1923.

¹⁹ Storch. *Loc. cit.*

the economic and social aspects, but because intrinsically it presents specific problems of such a nature that psychiatry might well devote its efforts exclusively to them with a fair prospect that their solution would throw more light upon the whole region of psychopathology than the solution of any other equally distinctive group. Not to go into too much detail, I will mention as some only of the problems of schizophrenia those of heredity, of constitution in its double aspect of organic and personality make-up, the relation of physical and mental, the neural and the extraneural pathology, the environmental factors, the nature and mechanism of regression, the criteria of malignancy and of archaic symbolization, the relation of precipitating factors to constitution, the significance of content, of the process of thinking, and of the conative, motor, or emissive aspects of thought, the problem of the unconscious, and of various mechanisms such as fixation mechanisms, etc., etc.

In the first place, the thinking of the schizophrenic approaches the kind of thinking of savages and children, as already indicated, in that the feeling component is more in evidence than reasoning, concreteness than differentiation, and perception than abstraction. The characteristics of schizophrenic thought processes and their similarities to primitive ways of thinking have attracted the attention of several recent writers. Thus Domarus²⁰ describes certain modes of thought which appear among primitive races and compares them with "normal," or scientific and logical thought processes which have survived as the "fittest," that is, the most useful in dealing with external reality. He recognizes three stages in development: the pre-archaic, the archaic-paralogical, and the paralogical-logical. In the pre-archaic, which may be supposed to have existed in such primitive forms as *Pithecanthropus* and in schizophrenic stupor, there is a generally lowered intensity of images, whether sensory or motor, and of affectivity, and a lack of any attempt to establish relationships between these images, and a lack of any real thought process. In the archaic thinking of a pre-logical kind, found among primitive savage races, the vividness of the images is greater than among more highly developed races, and the effect produced in the observer is projected and believed to be an inherent attribute of the object, which thus acquires a "demonic" character. All things which arouse a similar emotion are thought of as being actually the same. In dementia

²⁰ v. Domarus, E. *Praelogisches Denken in der Schizophrenie*. *Zeitschr. für die ges. Neur. u. Psychiat.*, 87, 1923. (Abstr. *Jour. Ment. Sci.*, April, 1924.)

precox there is a similar loss of objectivity; hallucinations and reality are imperfectly distinguished, and every happening has a meaning and effect on the observer; the idea of an action produces the action directly, instead of offering a possibility of action, and this is interpreted as a compulsion from without. Paralogical thinking is a stage beyond this: here identification of objects is based on similarities, differences being neglected. It follows the "law of participation" described by Lévy-Bruhl²¹—all things with the same qualities are the same: "certain Indians run fast," "stags run fast," therefore "some Indians are stags." This form of thought is common in dementia precox.

Storch, in a very interesting paper,²² takes up for consideration the ways in which the schizophrenic reacts to the world of reality and to his inner autistic world or world of phantasy. While for the normal person the chief criterion of the world of real objects is their independence of him, whereas imaginary things depend for their existence on him, the general characteristics of the schizophrenic's experience is that his mental and imaginary experiences have a substantial and concrete nature where the normal person would see only symbols and analogies. His thoughts have magical power and can produce real results; they have for him a substance and he can manipulate them physically. Speech has preserved many expressions which for the normal are symbolical, but for the patient actual; we "look down" on despised people—for the patient the physical act of looking down on someone makes him *déspicable*; we "collect our thoughts"—the patient makes gestures with similar meaning.

With regard to the world of hallucinations he says some patients feel these to be a representation of certain aspects of their own tendencies, distinguished by their vividness and actuality from mere imaginings, existing external to themselves, but differing from other external objects in their special relation to and dependence on the observer's ego—emanations from that ego.

The patient views the world of reality as changed by his delusional ideas as a new mode of existence; it has lost its identity as something separate from him, and is experienced as a sort of concrete interpenetration. We say that someone puts his whole soul into his

²¹ See my review of Lévy-Bruhl's *Primitive Mentality*. The *Psychoanalytic Review*, January, 1924.

²² Storch, A. *Bewusstseinsebenen und Wirklichkeitsbereiche in der Schizophrenie*. *Zeitschr. f. d. ges. Neu. u. Psychiat.*, April, 1923. (*Abstr. Jour. Ment. Sci.*, April, 1924.)

work—the patient experiences this as a concrete loss of a part of himself; we speak of “drinking in something with our eyes”—for the patient an actual interchange of substance occurs; every activity in relation to something of emotional interest to him is an exchange of forces between the ego and the object. This recalls the emanation idea of primitive peoples—the idea of forces which pass through space from one object to another. In a similar way there is an interweaving of the patient’s personality with that of the persons about him; the feeling of “being one with somebody” which we mean symbolically is felt as actuality by the patient; this same sense of union is felt with the universe, and is not unlike the experiences of mystics; he becomes God by this same process of interpenetration.

While his peculiar experiences have a concrete actuality for the patient, yet they are different from his experiences of the world of reality. The appearances of this autistic world are as vivid and real as external objects but their reality is different in that it depends on the observer. Attempts may be made to fit this world into external reality, such as ascribing sensations or pictures to some apparatus; or the patient may ascribe the appearances to some special gift of spiritual vision.

There are two types of the interpenetration of the self and the world; in the one the whole world may seem to be absorbed into the self, in the other the self is absorbed into the world. For the patient of the former types all objects are merely qualities of himself made concrete, emanations from himself. This view is based on the nature of his immediate knowledge and is akin to the mental processes of the savages. It corresponds to the “idealistic philosophy” which regards the phenomena of the world without material existence but merely as projections of the perceiving self. For the patient of the latter type the sense of being an individual is lost, the self is felt as a dependent part of the surroundings, which can penetrate into his being. He feels his thoughts are taken from him and he is thus deprived of portions of himself; he refuses to speak, since speech is a “giving away of himself” in the most literal sense, and he withdraws from all conflict with the external world to protect himself from the sense of loss which is accompanied by tension and emotional discomfort. Impulsive actions may be a reaction to such tension. He feels safe only in the most complete severance from the world, in the extinction of all relationships with it.

Wildermuth has studied the similarities between the real and phantasy worlds of schizophrenics and the real and phantasy worlds

of children.²³ Meyer-Gross had already called attention to the similarity in the behavior of the schizophrenic to that of the child at play—a behavior in which the child lives in a world of its own, but is capable at any moment of exchanging it for reality; he keeps them apart, however, and regards as a spoil-sport anyone who tries to mix them.

The similarity is even more far-reaching than this author has shown. The difference between the child and the patient is mainly that the former can always return to reality, and that after puberty he ceases to be capable of living in the autistic world with the former completeness. As the child grows older he comes to require more and more reality to make his game of pretense satisfactory.

Not only does the schizophrenic's conduct strike the observer as resembling play, but he himself feels it subjectively to have a similar quality. He says people are making a game of him; it seems as if he were taking part in some play that is going on, or he plays a part without completely believing himself to be the imagined person he represents; or the hallucinations give him the impression that some sort of moving picture or theater is going on.

Many other childish manifestations resemble those of schizophrenics: children's jokes, tricks, and plays in words have a similar autistic character, with no apparent meaning in relation to actualities, and this changes at puberty.²⁴ Children, like the patients, love to make up a sort of neoplastic language of their own, having meanings known only to themselves or their immediate circle. Perseveration and stereotypy in speech and action are often seen in children. Their musical performances show the same mechanical rendering, and the same preference for simple melodies and rhythms as are found in schizophrenics. The child lives far more in his unconscious or sub-conscious self than does the adult, and has only partially discovered himself as a personality—has not become a problem to himself. This may be due to incomplete development; the author considers the part played by defect of the ductless glands, and the concept of the imperfectly developed organism which fails when it has to face the tasks of adult life, and thus make it possible for mental traumata to determine the onset of the symptoms.

²³ Wildermuth, H. Schizophrene Zeichen beim gesunden kind. *Zeitschr. f. d. ges. Neu. u. Psychiat.*, September, 1923. (Abstr. *Jour. Ment. Sci.*, April, 1924.) In referring to this paper of Wildermuth and the two preceding papers of Storch and Domarus, I have made free to use, in considerable part, the actual language of the abstractor (M. R. Barkas) as it appeared in the *Journal of Mental Science* and I beg to here acknowledge my indebtedness.

²⁴ See Jelliffe, *The Signs of Predementia Praecox*, *Am. Jl. Med. Sc.*, 1907, for similar conception.

I have undertaken to define psychiatry, perhaps in somewhat loosely descriptive terms that are sufficient to indicate its general scope, its relation to the several sciences on which it is dependent, and to the healing art of which it is a part. I have indicated that the progress of science in general is from a descriptive stage to a stage of interpretation, and that sooner or later interpretation must come to a utilization of the historical and the comparative methods of study. I have shown this progress in the development of our knowledge of the sciences in related fields to psychiatry and in those upon which psychiatry particularly depends, particularly our knowledge of the mind, and I have utilized the evidences derivable from language largely for purposes of illustration. Finally, I have discussed a specific problem of psychiatry, namely, schizophrenia, and shown how the comparative method may be used in the interpretation of the symptoms at the psychological (symbolic) level. I have stopped the process of interpretation at this point, having indicated the fields to which interpretation would have to be applied if an interpretation of the whole problem of schizophrenia were attempted. Naturally a paper of this sort is no place for such an attempt. That would require a large volume. Here only small samplings can be dealt with.

No one would undertake to minimize the value to medicine of the germ theory of disease, but its influence undoubtedly extended to psychiatry, where it was peculiarly inapplicable, for the theory supposes the causes of disease to reside in the present and to invade the organism from without, both unfortunate concepts with which to approach such a problem, for example, as schizophrenia. In psychiatry questions of infection and of the present moment are both relatively unimportant. Here one must needs consider the organism as a whole in all that that expression means, not only in its present construction but what that structure means as the organized precipitate of hundreds of thousands, nay, millions of years of experience, integrated in large part by the nervous system, which is the master organizer, and coördinator of experience both phyletic and individual, the great integrator of the organism. Individual reactions which seem to have an adequate explanation in individual experience must of necessity therefore have archaic components, for to each reaction the individual brings his entire self, which includes his entire past. What appears to be the simple act of walking, when analyzed will not only be found to be made up of most intricate neuromuscular adjustments, but can be seen, in the rhythmic swing of arms in relation to the advancing feet, to contain the remnants of quadrupedal progression. I have given a similar illustration in the way in which

counting by fives has been preserved in our present methods of notation.

If, to use an analogy, the mind is but one aspect of the organism, as the facet of a crystal is but one aspect of the crystal, then, just as the size and form of that facet will depend upon all the rest of the crystal, so the mind must depend upon all the rest of the organism. The old-time problem (I prefer to call it a pseudo-problem) of the relation of mind and body is thrown into high relief but in a radically different way, not as to unrelated components of the organism, but to revert to the analogy of the crystal, as to aspects of the organism as a whole. It is possible, with this new way of looking at things, not only to solve old problems (mind and body) but to see new facts. For example, we understand why deficient organic structure and defective mind go together, and we can further understand how a compensatory psychosis may go along with a compensatory somatosis; why, for example, paranoiacs (compensatory psychosis) do not have tuberculosis but do have cardiac hypertrophy and vascular rupture (compensatory somatosis).

When psychiatry departed from the field of the immediate experiences of the patient it was on its way to the comparative method. The adoption of the comparative method, for which I am here only endeavoring to secure conscious recognition, was the opening of the way to an understanding of the human being which seems to me to be easily the most important accomplishment which science can have to its credit.

DYSOSTOSIS CLEIDOCRANIALIS WITH METABOLIC DISTURBANCES *

BY KNUD H. KRABBE, M.D.

OF COPENHAGEN

In the case of embryonal failure of development and disorganization there is often found the apparently most strange combinations concerning the regions which are seats for the said defect. We should remember the combinations of syndaktylos, exophthalmos, and steeple-shaped skull which is found in acrocephalosyndaktylism, the coincidence of suprarenal gland anomalies and brain defects, which is not seldom, or in the simultaneous existence of neuroglia nodules in the brain, nevi in the skin, and lipomas in the kidneys, which is characteristic of tuberous brain sclerosis.

In the following we shall communicate a case of such congenital failure of development in which the defects appeared dispersed throughout the organism and where, furthermore, in the case described, a metabolic anomaly was found which does not seem to have been described before in this disease.

The case described is one of so-called dysostosis cleidocranialis. Pierre Marie and Sainton, in 1897, gave the name *dysostose cleidocranienne* to a strange defect of the skull and the clavicle of which they describe some cases. The descriptions of such cases, however, date as far back as 1812, perhaps even to 1764, but it was not until the description was given by Pierre Marie and Sainton that the condition was ordinarily accepted as an independent disease.

The patient (H. L. L.) is a shoemaker, twenty-eight years old, who was admitted at the division for mental diseases at the "Kommunehospital" in Copenhagen on October 1, 1923.

The father (J. M.), who is sixty-one years old, resembles the son. He has also a large flat forehead and a large head; he is taller than the son, but he presents none of the anomalies which are found in our patient, neither cranial nor clavicular defects, nor any anomaly of the osseous system as a whole. He had syphilis when he was twenty years of age.

The mother (N. R. L.) did not resemble the patient. She died at the "Frederiksberg Hospital," where the post-mortem diagnosis was:

* From the department for nervous and mental diseases in the "Kommunehospital" in Copenhagen. Chief physician: Professor Wimmer, M.D.

compression of the spinal cord; carcinoma schirrosus of the dura mater. Thirty-one years before her admission at the hospital she had been infected with syphilis; there seems not to have been any osseous defects or other deformities, nor signs of endocrine disturbances.

The patient's mother's mother died at the St. Johannes Hospital in Copenhagen from acute mercurial intoxication and syphilis. In the notes about her nothing is indicated about osseous changes. She was very fat and somewhat defective mentally.

A brother of the patient is said to have been well developed and normal. The patient had this brother only, and no sisters. His father's brother, a daughter of the same, and several cousins are of normal form.

The patient is said to have been always somewhat backward mentally. He was admitted to the hospital because he had been rather disturbed; he also had hallucinations and was afraid there was poison in his food, and he had also torn his clothing.

At the examination in the hospital he made a somewhat psych infantile impression, but not in a high degree. He appeared to be in possession of ordinary schooling and he was rather sensible in his behavior. He has, however, during the entire stay at the hospital, made the impression of being somewhat hallucinated, as he has also repeatedly shown slightly persecutory ideas. He has been absolutely orientated and has not shown any anomalies of the mood.

The objective examination of the patient shows the following: The patient (Fig. 1) is short of build—148 cm. tall. The weight is 46.5 kg. The head form shows a characteristic "natiiform" aspect in that the theca of the skull is large with very protruding tubera frontalia. Between these there is found a 4–5 cm. wide, $\frac{1}{2}$ cm. deep groove which begins just above the glabella and is continued until the seat of the square fontanelle, where the groove is enlarged a little and is somewhat deeper. The groove can be followed further along the place of the parietal bones until the place for the triangular fontanelle, where it is somewhat accentuated. The region corresponding to the groove is not absolutely hard as bone, especially not around the fontanelles. No pulsation is felt. The skull is on the whole symmetrical and of very marked brachycephalic type; narrows considerably below the tubera parietalia. The circumference of the skull is 58 cm. The ears form a normal angle with the skull and are of normal aspect. The hair of the head is rather scarce, but not especially modified corresponding to the groove. The axillary and pubic hair is normally developed. No depression of the root of the nose, which is rather broad. The height of the orbit is astonishingly large in proportion to the width. The zygomatic arc at both sides is only a little prominent without palpable diastasis. There is a little prognathism of the mandible, but good articulation of the maxillae. The palate is very high without splitting of the roof. The teeth are very defective, obliquely placed, and irregular. The patient has a characteristic build, with a large neck and narrow

shoulders. His carriage is good. The fossae supraclaviculares are indistinct.

On the right side only the median half of the clavicle is ossified. The other half is felt as a cord of connective tissue. On the left side one-half is also ossified. From the apex of this there is a small cord of connective tissue leading to the lateral fifth, which is likewise ossified. The distance between the lateral points of the medial clavicular pieces is 16 cm. The distance between the respective



FIG. 1. Dysostosis cleidocranialis.

sternoclavicular articulation to the points of the median clavicular pieces is 7 cm. The clavicular pieces can be moved freely in the sternoclavicular joints just as floating ribs, and seem to be able to make a movement of 15 degrees. There is no subluxation medial of the humerus, but there is some hypermobility in both shoulder joints. The sternocleidomastoid, pectoralis major, latissimi dorsi, and the trapezii are normally developed. The strength of the entire upper extremities is good. Both actively and especially passively the patient can assume the queer position shown in the photograph (Fig. 2). Both shoulders, on account of the clavicular defects by adduc-

tion, are able to be brought almost in contact with one another in front of the chest.

The scapulae seem normally developed. The spine is naturally formed without signs of spina bifida.

Apart from the defects of the clavicle the upper extremities present normal proportions excepting the thumbs. These resemble drumsticks somewhat. The lower extremities are rather thin. They are held somewhat adducted at the hip joints, where there is some diminution of abduction and inward rotation. Both the trochanters

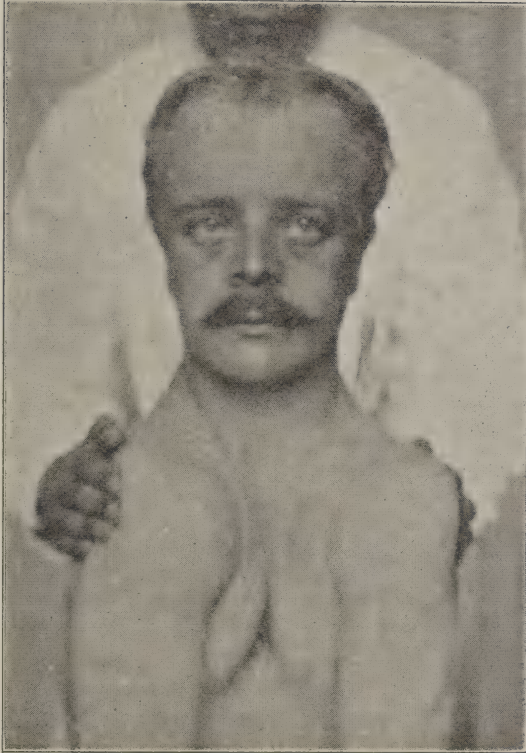


FIG. 2. Dysostosis cleidocranialis (the shoulders being passively adducted).

major are placed over the Roser-Nélaton line. There is a slight indication of genu valgum on both sides. The knee and foot joints are free. The large toes also resemble drumsticks. A detailed neurological examination shows absolutely normal relations concerning force, tonus, reflexes, sensibility, etc. The patient claims that he has never observed his clavicular defect and he has not suffered anything on account of it apart from teasing on the part of his fellow workers.

Further examination of the organism showed as follows: Stethoscopic examination of heart and lungs normal. There was no swelling of the thyroid gland; no anomalies of the skin, especially

no myxedema. The urine was clear, acid, containing no albumin, sugar, pus, nor blood. The Wassermann reaction was negative, the hemoglobin after Sahli 85. Erythrocytes, 4,040,000; leucocytes, 6,800. Differential counting in blood preparation stained after Leishmann's method showed normal relations.

The radiography of the skull (Fig. 3) presented in the frontal view a large defect of the bone about 3 cm. square, beginning a little over the glabella, going back to the region corresponding to the



FIG. 3. Radiography from the skull.

square fontanelle, where it is enlarged to about 8 cm. From here a narrow suture is continued back to the place for the triangular fontanelle, the osseous defect again becoming enlarged here. Further a triangular defect is seen corresponding to the lateral fontanelle. The suture is strikingly marked. The occiput is seen by a row of wormian bones to be divided in small bones. The squama of the temporal bone is very small. The nasal bone is not at all ossified. The radiography of the clavicles, corresponding to palpation, shows that the medial half alone are ossified. On the left side the extreme half part is completely lacking. On the right side, laterally, a little

clavicular piece is seen separated from the medial part by some centimeters.

The upper part of the thorax appears to be strikingly narrow. The thorax and the spine otherwise do not present anything abnormal, especially no signs of spina bifida. The pelvis appears to be very narrow. There is marked coxa vara on both sides (Fig. 4). The round head is seated at the temporal diaphysis almost without collar and with the great trochanter coming about 3 cm. upwards over the upper side of the head. Apart from this no anomalies are found in the X-ray examination involving the extremities. The basal metabolic process (examined by Dr. Cai Holten) gives the following result:

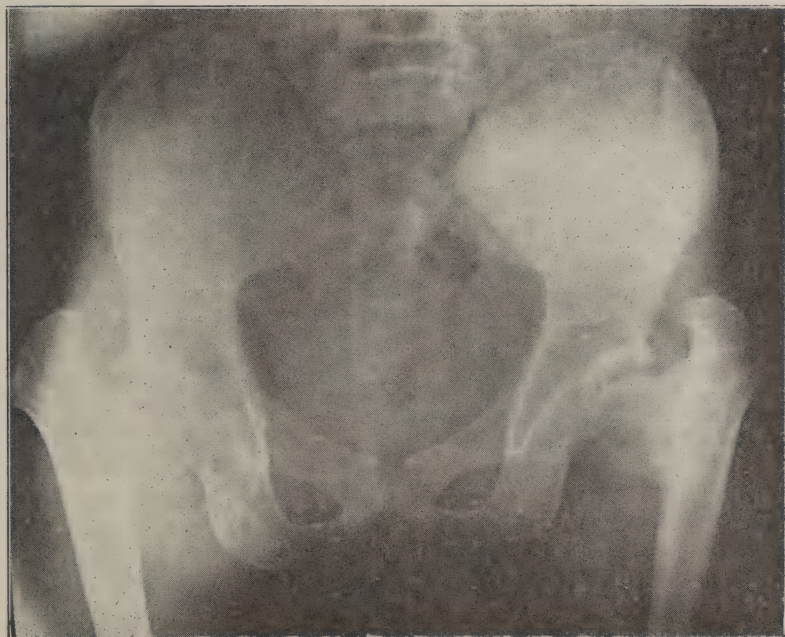


FIG. 4. Radiography from the pelvis, showing the coxa vara.

The calculated metabolic process was 0.88 calories per minute. On examination November 3, 1923, there was found, by means of the respiration apparatus of Hagedorn, that the basal metabolic process was 1.26 calories per minute, *i.e.*, it represented an increase of 37 per cent. On November 12 the basal metabolic process was found to be 1.13 to 1.16 calories per minute, *i.e.*, it showed an increase of about 30 per cent. The reason why a less marked increase of the metabolic rate was found at the second examination might perhaps be that the patient had eaten relatively little the preceding days, as he was discontented with the diet which was necessary. Examination of the blood sugar presented normal conditions both on fasting and after administration of 45 grams of glucose (not over 0.185 after

glucose). In two and one-half hours the blood sugar had reached again its original value.

There is no doubt concerning the diagnosis of this case. The combination of defect of the skull and of the clavicles, which is found both on palpation and by radiograph, is characteristic for dysostosis cleidocranialis to such a degree that no other disease may be considered. The resemblance with rachitic or hydrocephalic patients, which the dysostotic patients show at first glance, is apparent. Palpation immediately shows that neither rickets nor hydrocephalus can be a possible diagnosis.

At a certain point the patient presents an interesting problem. Both the mother and the mother's mother of the patient are said to have suffered from syphilis. Perhaps somebody would think that the dysostosis might be of syphilitic origin.

However, earlier examinations have shown that a great number of cases of the dysostosis cleidocranialis are found in the same families. Considering that the disease is so rare, its familial occurrence may not be accidental. It means that the disease must be considered as a heredofamilial endogenous disease. Further, it must be remembered that the patient does not present any sign of congenital syphilis and that the Wassermann reaction is negative.

There is absolutely no ground to believe that the bony defects are of syphilitic origin. But perhaps we could take into consideration another problem. In a certain number of heredofamilial diseases (for the myopathies, about 50 per cent, according to Erb) it is impossible to find similar cases in the family. For a certain number it must be admitted that the family history is known only to a very small extent. However, every heredofamilial disease must have its beginning somewhere in the family, and possibly some of the isolated cases must be considered as such beginnings. Just in this relation it would be interesting to examine if syphilis might play any rôle in the origin of the disease. Not in a manner that the disease should be a congenital syphilitic disease, but that there should be a blastophoria. The patient himself must be supposed not to be infected with spirochetes.

This consideration is purely speculative in that a single case like this is without significance; but it will be interesting to collect as large a material as possible of isolated cases of hereditary diseases in which the parents are known to have had syphilis but the patient is supposed to be nonsyphilitic.

About 100 cases of dysostosis cleidocranialis are described in the

literature. The oldest known case, by Martin, was published in 1765 in *Journal de Médecine et de Chirurgie* (Roux). In this case, however, only the clavicular defect is described. Prochaska described in 1812 a case of a "cretiné," aged thirty-three years, whose skull and shoulder skeleton were later examined by Hultkrantz, who established the diagnosis of dysostosis cleidocranialis. In the following decennia single cases were described until in 1867 Scheuthauer described two cases in which he emphasizes the connection between the defects in the skull and those of the clavicle.

In 1897 the disease is "authorized" by Pierre Marie and Paul Sainton, who give, based on four clinically described cases, a father and his son, a mother and her daughter, a detailed and classic description. They named it "dysostose cleidocranienne héréditaire." These authors emphasize as characteristic (1) a very marked development of the transverse diameter of the skull, together with a retardation of the ossification of the fontanelles; (2) a more or less pronounced aplasia of the clavicles; (3) the hereditary character of these malformations.

In the following decennium a series of cases were published, until Hultkrantz in 1908 gave an excellent and detailed monograph. Hultkrantz collected fifty-three cases from the literature, of which thirty presented both cranial and clavicular defects, the rest cranial or clavicular defects. He contributes descriptions of nine living dysostotic patients and an examination of six dysostotic skulls.

Hultkrantz's description and examinations are so detailed that there is little to add. From the later literature we have collected the following 28 cases: Heineke (1909), 6 cases; Still (1909), 1 case; Fitzwilliams (1910), 2 cases; Maldaresco and Parhon (1912), 1 case; Longmead (1916), 17 cases; Raubitschek (1915), 1 case; Crouzon and Bouttier (1921), 1 case. There are in all about 100 cases from the different countries described.

As mentioned, our case presented some rare complications, and we will therefore enter somewhat more fully into the problem of these complications.

When considering the literature it is striking how often there are found complications of the most constant and most conspicuous features in the disease, *i.e.*, the skull and clavicle defects. Not alone in the bony system, but also in joints, muscles, viscera, and nervous system these complications have been found. It is probable that these complicating anomalies must be considered not as accidental

but as a direct expression of the same hereditary elements as are represented by cranioclavicular defects.

In the material of Hultkrantz and the authors after 1908 are found: Thoracic deformities, 22 times; pathological spine deformities, 21 times; genu valgum, 13 times; malformations of the pelvis, 9 times; tibial curvations, 4 times; pes planus, 4 times. In addition to these complications, of which many must be considered as secondary consequences of the feebleness of the bony system, the following, which must not be considered as secondary, are also found: Cervical ribs or enlarged transverse processes of the seventh cervical vertebra, 6 times; spina bifida, 4 times; congenital pes varus, 4 times; congenital coxa vara, 3 times; subluxation of the radius, 2 times; incomplete ossification of sternum and os sacrum, 3 times; malformation of fingers, 2 times; flaccid joints, 2 times; synostoses of cervical vertebrae, 2 times; cupolated nails, 2 times.

Further, there are described isolated cases of congenital luxation of the hip, incomplete ossification of the bones of the hand, facial asymmetria "osteomalacia" and epiphyseal luxation. It is remarkable that cervical ribs seem most developed on the side on which the clavicular defects are most marked. Further, it is interesting that Hultkrantz has found that the phenomena of cervical ribs (of which the familial occurrence one of the authors [Krabbe] before has described), funnel chest, congenital pes varus, are found in normal patients to patients with dysostosis cleidocranialis.

Among the other complicating anomalies the muscular anomalies seem to be most prominent. Paul Heineke especially has described these. In the majority of the cases variations in the origin and insertion of the sternocleidomastoids, great pectoral, deltoids, and trapezius muscles have been found. Sometimes a feeble development of these muscles is noted. In cases of partial defect of the clavicles a cord of connective tissue is usually found which connects the rudiments of the clavicles, as an insertion place for the muscles which for the rest are normal.

Heineke has once found true defects of the clavicular part of the sternocleidomastoid muscle, three times defect of the clavicular portion of the deltoid muscle. The subclavian muscle is as a rule found to be rudimentary; once it has been found hypertrophied.

Among the other complications we shall mention that Marie and Sainton found tendencies to adiposity. Prochaska has observed a partial situs inversus of the organs. Dowse, Crouzon, and Bouttier have found epilepsy. Marie and Sainton made a diagnosis of

syringomyelia in their first case, a diagnosis which was verified by an autopsy made by Roussy and Ameuille. In five cases imbecility has been found. In the other cases the intelligence seems to have been good, apart from an isolated case of a psychosis, and a case of idiocy in a hydrocephalic child. Most cases have been described as undernourished, anemic, infantile individuals.

As in many other diseases of which the pathogenesis seems obscured, dysostosis cleidocranialis has been considered as a dysendocrine disease. Therefore it would be interesting to learn if in the literature endocrine disturbances have been recorded. There exist very few communications and examinations in this direction. These few communications are especially related to the thyroid. Paltauf communicates that in a case described clinically by Fuchs, in 1907, the thyroid, parathyroids, and pituitary glands were found normal at the autopsy. Hultkrantz found a transitory hyperplasia of the thyroid gland. He treated three other cases of dysostose with thyroidine without any result. He concludes from these cases that there seems to be no insufficiency of the thyroid gland.

Three of the published cases have been designed as "cretins," the cases of Prochaska, Stahl, and Gullan; the diagnoses, however, seem somewhat dubious.

The finding of adiposity in Marie and Sainton's case and the two cases which were complicated with epilepsy could draw the attention of the possibility of endocrine disturbances, but of course without any surety.

The observation of Stahl, that thymus persisted in a boy aged four and one-half years, must be considered as a normal circumstance. The development of puberty seems sometimes to have been retarded. Concerning the propagation and the vital functions the referred cases do not present anything abnormal.

The case which we have just published presents the typical picture of dysostosis cleidocranialis, but it also shows two complications which seem to present a certain interest: the bilateral coxa vara and the increase of the basal metabolism. Complications with coxa vara have only been undoubtedly substantiated in one clinical case described by Klar in 1906. It was a boy, aged ten years, with a congenital deformity of both hips; this deformity was first considered as a congenital luxation. Klar diagnosticated coxa vara, however, without giving any description of the symptoms.

Further, there exist two somewhat uncertain observations of coxa vara in patients with dysostosis cleidocranialis. One of these is an

autopsy preparation from a man aged twenty-six years, mentioned by Paltauf, the same case that Fuchs described clinically in 1907, without indicating the diagnosis of coxa vara. Paltauf only remarks that the neck of the femur in both sides is more horizontal than normal, and rather thick.

The other observation, made by Raubitschek, is from the autopsy of a man aged fifty-five years who died from nephritis. Here the diagnosis of coxa vara is without doubt, but the diagnosis of the cleidocranial dysostosis is dubious, a fact that also is mentioned by Raubitschek, in that he characterizes the case as until then the slightest observed degree of dysostosis cleidocranialis; there was found a little fissure of the frontal bone only and no clavicular defect. However, there were wormian bones as in dysostosis, and the face showed the characteristic type; further, the cranial measures corresponded to those which are indicated as characteristic for cleidocranial dysostosis. The patient was 110 cm. in height; he presented a kyphoscoliosis with thoracosternal deformities and partial ossification between the atlas and the occipital bone; further, there was an asymmetria of the skull and the brain. The form of the pelvis was normal; the bony system on the whole was feebly developed, especially the scapulae. Both the lateral humeral epicondyles were absent. This had caused a luxation backwards of the radii. Both heads of humerus were feebly developed. Finally, he had genu valgum and pes planus on both sides.

The diagnosis of cleidocranial dysostosis in this case of generalized osseous malformation is not absolutely sure. It might be a little suspicious that it could have been due to rachitis. However, many facts point in the direction that it is an atypical form of dysostosis cleidocranialis.

The patient whom we have here described has doubtless coxa vara, demonstrated by X-ray examination, in that the neck of the femur on both sides presents an angle of 90° with the femoral diaphysis. There is good reason to accept the opinion that the coxa vara has been congenital. The patient had always had a waddling gait. It is not probable that he has had rickets, and he had never had any traumatic affection of the hip. His occupation has never been of such a character that it might have caused a coxa vara.

Congenital coxa vara is a rare disease. Considering that in 100 patients with cleidocranial dysostosis there have been three, perhaps four, with coxa vara, in comparison with the fact that in dysostosis there are often found other osseous anomalies, it must be considered

as probable that coxa vara is not an accidental complication, but an expression for the same generalized bony anomaly which produces the cranial and the clavicular defects.

The other peculiarity which was found in our case was the increase of the basal metabolism. The examination of this metabolism was made twice by a very capable examiner, so that there is no reason to doubt that the results should be correct. The problem is how it should be interpreted. Doubtless many endocrinologists would draw the conclusion that the cleidocranial dysostosis is caused by an affection of the internal secretions. We are not inclined to that opinion. It could just as well be suggested that the metabolism anomaly was secondary, or, what seems to us the most probable, a parallel phenomenon; an expression for the fact that the hereditary anlage which decide the bony disturbances also determine anomalies of metabolism.

Until now this case of increased metabolism in cleidocranial dysostosis seems to be rather isolated. However, it indicates that it is necessary to make further investigations on this point, so that patients with dysostosis cleidocranialis, who ought to be examined in the future, should not only be examined with X-rays from head to toe, but also should be examined concerning their metabolism.

The conclusions of our examination of this case are that the dysostosis cleidocranialis should not be considered, as was done originally, as an isolated defect of the skull and of the clavicles. It must be considered as a generalized anomaly which interweaves the whole organism, although the symptoms justify the maintenance of its historical name: dysostosis cleidocranialis.

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THE SEX LIFE OF COLLEGE MEN ¹

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Reliable information concerning the sex life of the average man has not in the past been available. Increasing interest in sex hygiene and the attempts by educators and others to face the whole subject of sex with a new frankness, make such information highly desirable. Medical studies of the sex habits of individuals are usually made in the setting of clinical examinations, and therefore are not adequate for the determination of norms.

The Division of Medical Sciences of the National Research Council, through its Committee for Research on Sex Problems, has undertaken, among other projects, to gather more accurate data on the sex life of college men. As one phase of their work, some investigations were carried on by me during the past two years among various bodies of students, both graduate and undergraduate.

Questionnaire studies were made of different student groups and a discussion of some of the material thereby gained has already been published.² In addition to the questionnaire studies, individual interviews were held with students throughout the school year. In all, sixty men were seen, about half of whom solicited the opportunity, while the others were referred from college officials or other sources. The men represented all departments of university and college, and in about one-third of the cases there was some overt sex problem as the primary or secondary matter which they wished to discuss.

In connection with these investigations a glimpse was obtained into the problem of homosexuality, and it is this topic which I wish to emphasize in this paper. The subject will be approached from the objective standpoint without attempting any contribution to its deeper psychopathology. Certain facts and impressions gained from the investigation which bear upon homosexual attitude and behavior among college men seem worthy of presentation.

Among the men interviewed there were seven definite homosexuals, six of whom admitted adult overt experiences, while the

¹ Read before the American Psycho-Pathological Association, Philadelphia, June 7, 1924.

² *Mental Hygiene*, October, 1923.

other had a conscious homosexual inclination. Two additional men had sexual disorders quite clearly homosexual in origin, but at an unconscious level. A sidelight on the subject was gained from the answers to Question 53 of the questionnaire submitted to one group of students. This group was composed of graduate students, representing colleges from all parts of the country. The question read as follows: "In your association with boys and men, have you observed feelings of affection toward men similar to those which men ordinarily feel towards girls?" This somewhat veiled inquiry was preceded by a series of questions on related topics which would tend to make clear its significance. Twenty-eight, or 13 per cent, answered yes, and 189 answered no.

Based on these facts, with various indirect supplementary information, which need not be given at this time, I feel ready to make the tentative assertion that 10 per cent of college students are homosexual in the sense that they have definite conscious sexual inclinations toward other men, with or without engaging in overt practices. If such proportion, or anything approaching it, really does exist, the problem of homosexuality assumes large social and medical importance and demands serious attention and study.

The present attitude of college authorities appears to be fairly uniform toward the matter throughout the country. The policy of both academic and medical staff is to take official cognizance of the subject only when it is forced upon their attention by some flagrant student misbehavior. Summary action is then taken: the individuals concerned expelled, or otherwise disciplined, and the matter hushed up and forgotten. Men who seek information and counsel in regard to their own homosexual tendencies receive little aid and are apt to be viewed thereafter with suspicion. The majority of them are forced to work out their problem for themselves—either adapting to the homosexual level and becoming apologists for the type, or struggling with a secret which seems to them wholly degrading, and which they hide from their most intimate friends. It should be stated that there is evidently a desire on the part of medical men connected with colleges in this vicinity to establish some better plan for meeting the situation and they have been most coöperative in making possible the work here reported. It is hoped that a more comprehensive survey of homosexuality may be carried out in the near future.

I have included the following histories of a group of homosexuals which will tell their own stories. Seven of the nine men voluntarily sought medical counsel. Only one among them has failed to keep up with his scholastic work. In the majority of cases there was but

little overt activity and the homosexual make-up of the men was unknown to most of their friends and associates.

Case 1. Homosexuality. H., aged twenty-five, a graduate student, asked for an interview, in order to discuss his sex life. His erotic interests were wholly of a homosexual nature and for two years he had mixed with an artistic group made up of homosexuals in an eastern city and had engaged in frequent overt practices. On the whole, he was fairly satisfied with his sexual make-up and presented the usual arguments of the homosexual apologist. He was concerned over whether or not he should marry. He had something of an understanding with a girl who had been a childhood neighbor and school companion, and he had considerable desexualized interest in the prospect of a home and family. It was chiefly to discuss this last matter, *pro* and *con*, in a rather general way, that he approached the physician.

Physically he was of delicate build, but had no definite symptoms of ill health. His manner was slightly effeminate. His only complaint of nervousness was a "fidgetiness" when in social or other gatherings. He had been a quiet, retiring child; the mother died when he was five, and he was brought up by a kindly housekeeper, toward whom he had no strong sentiment. The father was a merchant in a small middle western town. He had married three times, and H. had two older half-sisters and one half-brother much younger, the last marriage having occurred when he was in high school. The father was overbearing, opinionated, and intolerant. He was, however, just and generous, so far as the material welfare and education of his children were concerned. H.'s whole life had been one in which antagonism and resentment to the father had been the dominant factor. Throughout high school he looked forward to breaking home ties by going away to college. In his third year in college he practically ran away, going to a distant city, without informing the family, to make his own way. This move was again motivated by an attempt to break from the father domination. He felt forced to this step in spite of the fact that the two were in distant cities, and saw each other but seldom. Even economic independence did not bring a sense of freedom, and he continued to feel a bitter hostility and sense of bondage. In spite of this attitude, he was willing to accept financial aid from the father again while doing graduate work.

In make-up he was of sanguine disposition, a fair mixer, and had healthy enough objective interests. He cared little for athletics or outdoor life, but was interested in music and dramatics and was enthusiastic over travel. His intellectual tastes and abilities seemed of good average. He had always been fond of the company of girls and was popular with them, but his relations were more those of comradeship than of love. He had learned the facts of sex early and masturbated without special conflict from puberty to the present. It was difficult for him to trace the development of his homosexuality. His first overt experience was at the age of nineteen, when he was "picked up" by a man in a public park and submitted to fellatio.

This caused him profound shame and remorse and he never repeated an episode of such grossly sensual nature. His later overt acts were with men who were companions and friends, and toward whom he felt respect and affection. He appeared to believe that the latter relationship lifted the sexual acts onto an entirely different plane. Since coming to Boston he had kept his homosexuality in the background. He had made several friends whom he believed had the same make-up as himself, but no confidences had been exchanged. With one of these men he planned to tour Europe during the summer. There was no close sentiment between the two, but a tacit understanding existed that each would not be too critical of the other's habits.

All this information was given in confidence, but at the same time the man showed not the slightest fear of exposure and no sense of humiliation or inferiority on account of his sexual abnormalities. He did state, on one occasion, after upholding the thesis of homosexuality, that he supposed everybody would rather be normal if they could. He admitted a long struggle against the tendency during the college years while he had been attentive to a girl friend.

No treatment was undertaken or definite advice given. The man was listened to respectfully, and an attempt was made to let him see homosexuality in the light of a psychobiological defect rather than to view it according to his habit as a special type of development on the level with normal sexuality. This man failed in his final examinations and did not return to college another year.

Case 2. Homosexuality. A., aged twenty-three, a graduate student, requested a consultation ostensibly on account of difficulty of application to his college work. He soon frankly admitted that his real purpose in the interview was to discuss his sex life. He was a homosexual, with little interest of any sort in women. Until three years before he had kept the tendency secret and felt a deep sense of inferiority concerning it. Since that time he had taken a new point of view, and had entered into alliances with other men and had become an apologist for the type.

Physically he was tall and robust and in vigorous health. He denied any nervous symptoms and there was nothing effeminate in his manner. As a young child he showed no outstanding peculiarities. He was brought up on a farm in the Middle West, the youngest of five children. The father was the autocratic type of parent who did not spare the rod. The mother was much younger; quiet, gentle, and neurotic. A. was devoted to a sister, seventeen years older, and described their letters to each other prior to her marriage as "real love letters." He fitted in well at school and college, working his way through the latter. He took little part in athletics, but was a member of the Glee Club, a leader in dramatics, and prominent in various organizations. His tastes tended toward what he called the "better things." In reading, American biography, history, and psychology were his choice. In the arts he cared for the more serious drama and was fond of good music. He enjoyed hiking and mountain

climbing, and mixed easily in a social way on all occasions. He was ambitious to succeed in his chosen field and was persistently industrious toward that end. He had given little serious thought to religion or social problems.

His psychosexual life had from early childhood been somewhat morbid. As a young child he played much with dolls, but cared much more for boys than for girls unless the latter were of the tomboy type. His admiration for his father was strong, in spite of the latter's severity, and the feeling had lasted to the present. He remembered their going in bathing together when he was a child, and his interest in the father's genitals. His relations toward the mother were amiable but not intimate. For several years, when about ten, he was devoted to the company of the hired men on the farm, but recalled no vulgar talk or bad sex teaching. He masturbated over a longer period than usual, but implied that he had the habit under control at present. At the time of night emissions he formerly dreamed of men, but lately dreams of women had taken their place. He first noticed that he was unlike other boys during high school, when he realized that his feelings about girls were vastly different from theirs. This attitude and his gradually developing sexual interest in men he kept secret, hoping that he would later become like the others. During his last year in college he became acquainted with an exchange professor, under whose guidance he obtained access to the intellectual circles of the community, and a new horizon of interest was developed. This professor was a homosexual and gradually converted A. to a justification of his own tendency in that direction. The relations of the two finally became intimate, consisting, however, in mutual embraces rather than in cruder types of perversion.

Through the defense which A. presented for homosexuality was revealed an uneasiness which demanded self-justification. He appeared to hope that he might get support and approval from the physician who would bring a tolerant psychiatric point of view to the problem. Any real desire for cure of his sexual abnormalities he kept in the background.

At college he was a member of a prominent social club and other organizations and evidently was popular with his mates. In order to doubly conceal his homosexuality he professed an interest in girls quite foreign to his nature, and ironically stated that he had "achieved something of a reputation as a gallant." He commented on the mysterious capacity which homosexuals had for recognizing each other, and testified to his own powers in that respect. He claimed there were a large number of the group in college whom he had identified. One law student he met through the accident of adjacent seats at a college play; the attraction was mutual and a friendship was formed with a distinct sexual coloring. The other man, who was a prominent athlete, differed from A. in being deeply chagrined and humiliated on account of his weakness. Another acquaintance was mentioned who had strong religious trends and who reported his homosexual indulgences regularly at the confessional. A. expressed

deep disapproval and disgust at homosexual prostitution, and only defended physical intimacies when part of a mutual "love relation." The advantages which the homosexual had in business and social fields he felt were many. The balance of masculine and feminine traits he claimed made possible a suitable appeal to those of all temperaments and of both sexes. He felt, also, that the homosexual had finer sensibilities and esthetic feelings than his coarser brethren, and was thereby better able to give appreciation in artistic and general cultural fields.

As in the previous case, no attempt at therapy was made with this man beyond giving him the general medical viewpoint on his condition. A year later he reported in response to request. He had done excellently in his college work, was given high recommendation by his immediate superiors, and a teaching opportunity had been offered him. His attitude toward his sexual make-up was not wholly clear to the examiner, and he did not appear completely frank. He had, however, lost all tendency to act as an apologist, and stated that since the previous interview he had better understood his condition and was more hopeful for the future. He claimed a growing interest in girls and the determination to marry.

Case 3. Periodic depressions and homosexuality. E., aged twenty-nine, a graduate student, asked for consultation on account of periodic depressions, the first one occurring at twenty-one, during his junior year in college. They lasted from a few weeks to several months and were seldom associated with any known cause. During them there was morning exhaustion, self-condemnation, and exaggerated inertia toward mental or physical effort. He shunned acquaintances and often gave up work for periods—sometimes a few days only. Shortly after the war he spent two years in convalescence from one of these attacks. During the intervals of what he called his "normal state" he was of buoyant mood and very active. He felt that he must restrain his talkativeness and animation, which, to his mind, assumed at times morbid proportions. The description is typical of the cyclothymic type of make-up, and seemed of fairly serious significance. In addition to the mood disorders (and no doubt intimately connected with them) were homosexual tendencies of which he was fully aware.

Physically he was small, but well developed, and had always fair general health. He complained of no nervous symptoms other than the depressions. He had always suffered from self-consciousness and had made many efforts to overcome it by practice in public speaking and so on. He had read widely in psychology, with introspective interest, and had taken courses at several personality or character-building institutes. A brief trial of Christian Science had also been made.

As a child he was delicate, and teased for being a "mother's boy," though this did not prevent him from being notoriously mischievous. Throughout his childhood he was morbidly sensitive to charges of effeminacy. His home life was not too happy, the father being

domineering and severe, and E. in constant conflict with parental authority. There was much friction between the parents and he always sided with the mother. Relations with her, however, were not intimate, and he referred to her as the "nonintellectual type." There was one sister, four years older, with whom he was quite congenial. In school he obtained high grades and was a leader in dramatics, debating, and social affairs in general. He attended a technical college and was again prominent in music, literary, and social organizations. Artistic interests were prominent; music and painting appealed particularly to him, and he showed some creditable talent in both fields. He was also interested in esthetic dancing and had considered making it a career. He was not democratic socially and chose his friends on the basis of intellectual attainments. He had always an active social interest in girls and had been popular with them. He had floundered about considerably in settling upon a life-work. The profession of interior decorator appealed to him strongly, but he had finally decided on a business career. He spent two years in the Army and evidently did fairly well, but found the life altogether irksome and rebelled in spirit. After discharge he came home to find his business in a bad way, and that he had been jilted by his fiancée. There followed his most serious depression. As he described his symptoms, care in a hospital for mental diseases would have been indicated, although he struggled through successfully without it.

He had long been conscious of sexual attraction directed about equally to men and women, and had guarded himself against too sentimental friendships with the former. He discontinued masturbation at eighteen after much conflict. He had a few heterosexual experiences, but for the most part was continent on moral grounds. Twice after the age of twenty-five he had overt homosexual relations—on one occasion while he was depressed, and on another when he had been drinking. There was an overpowering sense of degradation and guilt in relation to these offenses. He had become engaged to be married the second time and was awaiting more security of mental health and financial condition before settling down.

This man appeared in urgent need of intensive psychotherapeutic treatment. He was referred to the Psychopathic Hospital Out-Patient Department and assigned to a physician for regular meetings. These continued for some months, and he expressed himself as having profited by them. He was not as coöperative as expected, and showed strong inner resistances to the deep personality study and self-understanding which was indicated.

A year later he sought an interview on account of some mild recurring symptoms of depression. On the whole he had done much better than in previous years; was more spontaneous in his friendships, less afraid of his homosexuality, and quite confident that he could adjust to it and lead a normal sexual life.

Case 4. Homosexuality. J., aged twenty-one, a junior in the academic department of a local college, was having difficulty with his studies and complained of a vague, anxious depression. On several

occasions he had thought of suicide. In his own mind he connected his trouble with his sexual make-up, and finally, on impulse, confided to one of his instructors. The latter was markedly perturbed over the revelations and he referred him to the Department of Hygiene.

He was a large, highly colored individual, with somewhat feminine bodily contour. There were no nervous symptoms other than the mental depression. As a child he was shy and considered "sissified" by his mates. The family included several brothers and sisters and home life had been pleasant, though discipline was rather strict. He was somewhat slow to learn, but had managed to make good grades in school. He was never athletic, but took part in dramatic and debating activities and was editor of a high school paper. In college he was on the Glee Club and mixed very well socially with both sexes. Dramatics, music, and the study of ethics, in which he was specializing, were his main interests. He was not widely read, but had considerable cultural background. A business life did not appeal to him, and he appeared to have some genuine altruistic interest in social welfare which he felt he might best express by studying for the ministry. After some periods of hesitating doubt in religion, he had returned with definite relief to the orthodox faith of his childhood. In mood he tended to recurrent gloominess when the "world was all wrong," and he also worried unduly about small matters.

His sex life began early with masturbation, which had continued to the present, accompanied with considerable conflict over moral issues. Homosexual practices were inaugurated at twelve and continued infrequently through grammar and high school. Dreams at times of night emissions were homosexual in character. His feeling toward girls was more of companionship than love, and "petting parties" disgusted him. There had been a few overt homosexual episodes in college, usually unpremeditated and following wrestling or other rough play. Both rectal and intrafemoral methods had been employed. He seemed to avoid, rather than seek, such relationships, and felt that he had gained full self-control.

This man, like many of the others, was more interested in his depressions than in his sexual disorder, and loth to assign the latter as a cause. Seen a year later, he expressed himself as much more free from nervous symptoms and not disturbed by homosexual temptations. He did not take advantage of an opportunity offered him to have a special psychotherapeutic study in a hospital clinic.

Case 5. Homosexuality. F., aged twenty-four, member of a graduate department, was referred by the college physician. Certain homosexual tendencies which he possessed had come to the attention of the dean and medical advice was desired as to whether he should be given a degree and be permitted to accept a teaching position which had been offered him.

He was one of several children in a wealthy and public-spirited family. Home life had been pleasant, discipline intelligent, and every advantage had been given him. His physical health was good and he denied nervous symptoms. In school and college he had been

a social leader. His intellectual attainments were of fair level and he had a cultivated acquaintance with the fine arts. He had considerable wholesome interest in girls; was something of a social "lion," and looked forward to marriage. Masturbation had begun early and continued, in spite of severe conflict, until two years before examination. As a young boy he was given to hero worship. During his college years he had various "crushes" on fellow students and had indulged infrequently in mutual masturbation with resulting conflict and remorse.

The episode which led to his difficulty with college authority took place while a group of students were en route to a meeting in another city. F. shared a berth with another man, and made some amorous advances to him, which the latter resented and reported to the dean.

During the interview with the psychiatrist he was somewhat lofty and arrogant in manner, in spite of a genial address. He claimed he had no other intent than to give an affectionate embrace to his bed-fellow, and his whole attitude in the matter was summed up by his remark, "I don't see any harm in that." He looked upon the dean as well-meaning but lacking in breadth of view.

This man's homosexual tendencies did not appear dominant or especially serious, and in spite of his unrepentance it was thought that he would profit by his experience and was capable of self-control. He was given some robust counsel, which somewhat ruffled his complacency but which he accepted in fairly good spirit. In accordance with medical advice, he was permitted to continue his college course and follow out his plans for a career.

Case 6. Homosexual Neurosis. L., aged twenty-five, student in a graduate department, showed but little surface evidence of personality difficulty. He kept up with his work, had plenty of friends among his classmates, and joined in the gay social life of the more wealthy students. Underneath the surface he was struggling with a complex neurosis, characterized by marked uneasiness and a deep sense of inferiority, which had resulted in many compensatory manifestations and elaborate rationalizations. He felt that he was missing much of the fullness of life which others experience, and he reacted with a mixture of melancholy and bitter vexation. An elusive sense of inner bondage was always present, which to him seemed wholly intangible. He recognized some abnormality in his sexual make-up, but was insistent that this phase of his life had no connection with his main difficulty. He had little spontaneous interest in girls on any level, while he admitted that in his friendships with men "there was something akin to love." A moderate degree of masturbation was practiced without apparent conflict. There had been no overt homosexual experiences or conscious desire to participate in them, but he frequently found himself in sentimental relations with other men, usually in the rôle of recipient. Frank homosexual dreams were not uncommon.

As a child he was timid with other boys, and lived a rather sheltered existence. He was annoyed by a habit of easy blushing or

crying when under excitement. In school and college his guiding principle had been to conduct himself so that he should not be considered effeminate. The persistency with which he trained in athletics had brought him into notice, in spite of the fact that he had never qualified for a team. He stood in awe of the more popular men and suffered from deep loneliness. He was much given to philosophizing, preferred to think rather than to read, and would often sit for hours absorbed in his meditations.

An episode a year previous to examination, according to his own story, marked a new epoch in his life. While with a group of companions, all of whom had been drinking, he felt that a remark was made reflecting on his masculinity. He flew into a rage and, as he could not identify the spokesman, defied the whole group, individually and collectively, in no uncertain terms. This incident gave him a new self-confidence, and he claimed that then ended forever his feeling of effeminacy. In spite of this change of attitude, his discontent and uneasiness continued, and, against the advice of family and friends, he gave up his graduate studies for a period of travel, having in mind the search for that fuller life which he felt had eluded him. A letter received from him a year later gave the impression that he was making some headway with his difficulties.

There was considerable that was ominous in this man's clinical picture. What part his homosexuality played was by no means clear, but certainly psychiatry should offer something to supplement his own unaided efforts in meeting that feature of his problem.

Case 7. Obsessional Neurosis; Homosexuality. B., aged twenty, a third-year student, was dismissed from college for taking part in homosexual practices, a public toilet in one of the college buildings being the scene of his activities.

He was an only child of wealthy parents, both of whom died when he was in preparatory school. His sexual life had been precocious in its development. He had masturbated without restraint from an early age, and at least from his fifth year had homosexual phantasies and dreams. Although considered by his mates as somewhat odd and seclusive, he had fitted into preparatory school and college without special difficulty, and had made a few good friends among the better type of boys. He kept wholly secret the sexual coloring which was present on his side in these friendships. Crude sex activities absorbed more and more of his thought and time. For some months he had spent hours nearly every day in various toilets, masturbating repeatedly and surreptitiously watching other boys who came there for natural purposes. Overt homosexual practices had begun only a few weeks before exposure. He had avoided serious conflict by all kinds of neurotic evasions, and when seen after his expulsion presented a clinical picture of a profound obsessional neurosis. Guarded confessions to school physicians on two different occasions had not been well received and had strengthened his determination to keep the matter to himself.

This man's crude sensuality was in marked contrast with many

other phases of his personality which were of a high order. He is now under psychotherapeutic treatment and much has been uncovered to throw light on the evolution of his sexual abnormality, and to give reasonable hope that it is open to modification.

Case 8. Platonic Love Situation. M., aged twenty-four, was referred by the college physician whom he had consulted relative to his contemplated marriage. He had recently finished a graduate school and was leaving at once for his home in a distant city. He had become engaged shortly before to a lady three years his senior. She was a college graduate and employed as a private secretary. The relations between the two were wholly on the level of comradeship, with congenial intellectual tastes and interests. Passion was entirely absent on both sides. There had been no demonstrativeness between them, not even a kiss, and they planned to live together as brother and sister. The desirability of children had been discussed, and it was agreed that in the future they might desire progeny, for which purpose the necessary preliminaries would have to be faced. The night previous to the consultation the lady had spoken of breaking the engagement on account of a confession of masturbation which M. had made to her, and he wished advice on the position he should take.

During the interview he was considerably on the defensive and had a rather supercilious manner. His physical health was good and he was not noticeably effeminate in appearance. His home life had been congenial and he had done well in school and college, although he mixed very little socially. He had masturbated from early childhood and until he entered college had practiced it daily. From that time he had struggled to decrease the frequency until it occurred only at rare intervals, and he was determined to give up the habit altogether. He stated that as a child masturbation made the general phantasy life in which he indulged more pleasant—"dreams flowed more freely." The general subject of sex had always been repulsive to him. He would leave the room if a vulgar story was told, and he could tolerate the idea of sex relations better with girls to whom he was indifferent rather than with one whom he loved. His fiancée's viewpoint was that if he gave up masturbation as he planned, he might develop a desire for marital sex relationship, and to avoid such risk the engagement should be broken.

The psychopathology in this case was of course not clear without further analysis. Very likely both man and woman were unconscious homosexuals, who sought to find sex compromise in the contemplated Platonic union. The young man was told frankly that what he was discussing was neither love nor marriage, and that important medical features entered into the situation. He was advised to consult a psychiatrist for treatment.

Case 9. Obsessional Sex Interest in Prostitutes. R., aged twenty-two, was seen for one interview the night previous to his departure from Boston. He had gone to the office of the Massachusetts

Society for Mental Hygiene, seeking advice concerning a sexual disorder, and was referred to the examiner. He was a graduate of a western college and had spent one year specializing in English literature. He had only a nominal interest in the subject and his plans for the future were unformed. For several years his thoughts had increasingly been concerned with crude sexual matters. His interest was wholly directed toward prostitutes—the more flagrant the type, the greater the sexual appeal. The thought or sight of such women caused marked sexual ardor, and on at least one occasion, while in a street car, an orgasm occurred as he gazed at an overdressed and painted woman of the streets who sat opposite him. He denied ever having sexual intercourse, but recently had been “picking up” women in his car and taking various liberties with them. He stated that his continence was due partly to ethical principle and partly to fear. He correctly described his condition as an obsession, and frequently referred to himself as a “degenerate.” He had no sexual feeling whatever toward girls of good character whom he met socially. During the interview sexual material so engrossed his attention that it was difficult to direct him to other phases of his history.

He was the younger of two children, and the home environment seemed to have been healthy and happy, although he was rather strictly brought up. He had average physical health, had done well in school and college, and was a fair mixer in a social way. His tastes and interests were rather narrow, but in no way odd. He had never used alcohol, and for the most part his friends and associates were of good character. He claimed to have masturbated from the time of circumcision, at the age of four, until a junior at college, gradually decreasing the frequency, and finally giving up the habit. He worked out this problem by himself, and was guided largely by the old orthodox attitude of sin and fear. Night emissions were frequent and accompanied by vivid sexual dreams. He admitted considerable waking phantasy of the same order, and stated that all the “obscenities” which he read in books “stuck in his mind.” His manner was tense and anxious, and he seemed sincerely to desire to free himself from the domination of sexual ideas. He thought of going to work on a farm with the hope that outdoor life might aid in this object. He had taken nobody into his confidence previously.

There was time for only the most superficial study, but it was quite evident that in the man something was blocking free outlet to the sexual phases of normal love, and girls whom he would think of marrying made no appeal. A number of factors might be operating to produce such a result, but the most probable seemed to be a latent homosexuality, which showed itself by an obsessional sexual striving toward other men through the medium of a woman used sexually in common. The man was talked to briefly concerning the theories of modern psychopathology relative to his condition, and there was noticeable relief in the tension of his manner and facial expression. Further analysis and reëducation were imperatively indicated in his

case, and he was referred to a psychiatrist in his home city. Six months later a letter was received from him, asking that his history be forwarded to a physician whom he had consulted. He claimed to be partly freed from his sexual obsessions, but showed a general hypochondriacal attitude in regard to his physical health.

It seems clear that homosexuality among college men is a matter which should not longer be ignored by psychiatry. To wait until secondary neurotic developments make treatment imperative, or until public exposure of overt acts calls for disciplinary procedure, is not in accord with present day mental hygiene. The practical importance of the matter remains the same, whether biological, psychological, or social factors are predominantly responsible for the homosexual attitude. The first step toward intelligent management must be a more complete and systematic knowledge of the problem, and it is as a preliminary contribution to such knowledge that this paper is presented.

A CASE OF PERIODIC PARALYSIS ASSOCIATED WITH THYROID ENLARGEMENT *

By A. S. MACLAIRE, M.D.

NEW YORK CITY

In view of the extreme rarity of this disease, which has the added features of not being familial, existing in a mild form readily overlooked and associated with an enlargement of the right lobe of the thyroid gland, I feel it essential to place this case on record in addition to those already reported.

Report of Case. On May 31, 1924, M. Z. was referred to my clinic at the Hospital for the Ruptured and Crippled complaining of weakness in the muscles of the entire body but more especially in those of the thighs than elsewhere.

The first indication of any muscular condition was noted seven or eight years ago, when suddenly, after walking quickly a few blocks, being late for work, he experienced sharp pain in both legs near the ankles. On careful investigation it was learned that fatigue preceded the pain. He walked slowly the rest of the distance to work. This muscle pain persisted the entire day, but he did not seek medical advice nor did he apply any local remedies. He soon learned that if he walked fast he would develop this muscle pain in both thighs and legs, which was always followed by weakness in those same parts, lasting a varying period of time. This compelled him to be more cautious, so that he would always walk slowly. He later noticed that even walking slowly would produce fatigue.

Four and one-half years ago he was operated upon at Mt. Sinai Hospital, where a right nephrectomy and a left nephrotomy were performed for bilateral nephrolithiasis and multiple right renal abscesses. He was in bed for nine weeks. After his discharge from the hospital in the latter part of November or early part of December, 1919, he felt extremely fatigued and was unable to lift his legs for a few days. He attributed this weakness as a result of being confined to bed for so long a period. A complete recovery was obtained in a few days.

Two or three years ago he noticed that if he grasped an object tightly in his hand and clenched his fist, he would soon become fatigued and muscle pain would develop in that extremity to the extent of compelling him to relax his grip upon the object. In addition, his hand would tremble.

This condition persisted unabated or uninfluenced until June or

* From the Neurosurgical Service of the New York Polyclinic Hospital and Medical School.

July, 1923, when without attributable cause both shoulders became fatigued and he was unable to lift his arms. A few weeks later, while attending a meeting where he sat for three or four hours, he found that he was unable to rise from his seat. His legs felt as if they had become paralyzed. By supporting himself on a table, he managed to get to his feet, but felt very weak. He walked to the stairs, a distance of twenty-five feet, took two steps downward, when he fell on his knees owing to weakness. As the patient stated, his legs failed to support his body weight. He had to be assisted to his feet. With great difficulty he managed to walk, but it felt as if he were walking on wooden legs, not that there was any change in sensation, but that they were so weak. He hailed a taxi, and after placing one foot on the running board he found himself unable to raise his body, and he again fell to his knees, whereupon he had to be assisted into the cab. After arriving at his destination (twenty minutes later) he found that he could not get up from the sitting position, and had to be aided to his feet. He walked a few feet to the house and by the aid of the balustrade managed to climb up two flights of stairs. The fatigue was so great that after sitting on a chair for a short time he was unable to remove his trousers because he could not lift his legs. After a short time he finally undressed himself and retired to bed. While in the recumbent position the legs could not be elevated from the horizontal plane, nor could he turn himself over from side to side. It was with great difficulty that he managed to dress himself the next morning and, in spite of much fatigue, to walk to the elevated station. While at work, after standing on his feet a few hours (the patient being a tailor), a gradual return of strength was noted, which was complete within the next two or three days. Fatigue was easily brought about by rapid walking, and therefore was avoided. That same night, after being in bed two or three hours, he attempted to roll over from side to side, but soon learned that the fatigue and weakness had recurred and that the legs had become powerless. By means of holding on to the bar at the head of the bed with his hands he managed to turn himself over. This exertion, however, produced weakness in the arms. The next morning dressing was found to be an extreme effort. Complete recovery was not obtained for a few days.

His health remained normal for a few weeks, when he visited a friend at a summer resort. After sitting on a chair for a few hours it became difficult for him to rise, but with much effort succeeded in doing so. Upon rising to his feet he fell; his legs simply gave way from under him, as he stated it. In attempting to rise from this fallen position by means of holding on to some nearby object, he was amazed to learn that his arms were as powerless as his legs. He called for aid and was assisted to his feet. Fifteen minutes later walking was attempted, with the result that the same experience recurred. Sufficient recovery occurred to enable him to walk two or three blocks to the station. With assistance he managed to walk up the stairs on arriving home, and immediately sat down, but did not

retire soon after. To move his legs was impossible; his arms felt tired, but not to the degree of his legs. A few days were required this time to return him to normal.

He remained well during the entire winter of 1923 and 1924 until Easter, when he went to the same summer resort mentioned above. It was very windy there. That night he retired at 12 o'clock midnight. After being in bed a few hours the entire body felt fatigued; the legs and arms became powerless. With great exertion he succeeded in dressing himself the next morning. This attack disappeared in two days.

One month later, after walking up two flights of stairs, great fatigue in the thigh muscles was experienced, which necessitated his sitting down for one hour. Upon attempting to rise this same weakness persisted, and he suspected that an attack was impending. After taking a few steps he fell to his knees and was powerless to rise without assistance. He retired to bed immediately, but was unable to move. He resorted to the use of his hands to turn over in bed, but found that the arms were so powerless as to be no support at all. Mere stretching out of his arms caused fatigue and muscle pain. For the first time someone had to dress him the next morning. In addition, he felt faint and weak. Three days were required for recovery.

At no time did the patient experience any subjective sensory disturbances. As far as he can recall, headaches have been present as often as every three weeks to a month, but that they were not necessarily associated with any of these weak "spells." Palpitation or other cardiac complaints were absent. Vomiting also was not present. He perspires very freely when asleep and upon the slightest exertion. His appetite is not very good. He sleeps only fairly well. His bowels are regular. Nocturia is present only once a night and diurnia three times a day. He takes one or two cups of coffee a day, tea only occasionally. He does not indulge in liquors of any kind. His smoking amounts to two to four cigars a day.

His past illnesses consisted of measles, scarlatina, and "brain fever" as a child. Both gonorrhea and lues were denied. Twelve years ago he burned his right hand, and that same year had an infected hand. Fourteen years ago had his tonsils and adenoids removed. Seminal vesiculotomy was performed ten years ago, and in 1919 had a right nephrectomy and a left nephrotomy.

He is married nine and one-half years. There are no progeny. His wife has never conceived. Both of his parents are alive and well, as are two sisters and one brother. One sister died from diphtheria. As far as he personally can recall, there has been no one in the family with any complaint similar to his.

Examination. The patient was admitted to the New York Polyclinic Hospital, where the neurological examination was made.

He is a robust, healthy appearing young man. Romberg, adiadochokinesis, and ataxia are absent. There is a fine, rapid tremor of the hands. The deep reflexes, biceps and triceps, are normal and

equal; the patellas and achilles are active but equal. Babinski and all of its modifications are absent. The left superficial abdominal reflex is absent; all the others, including the cremasterics, are present normally. Sensation for touch, pain, temperature, and muscle tendon are all unimpaired. The cranial nerves were negative. A short summary will be given. The fundi failed to reveal anything abnormal. The pupils were equal, reacted to light, accommodation, and consensual reflexes. Ptosis, nystagmus, and exophthalmos were absent. On convergence the right eye diverged to the right; all the other extraocular movements were normal. The left palpebral fissure was slightly wider than the right. The sensory and motor divisions of the trigeminal nerves, including the corneal reflexes, were intact. The facial nerves were normal. No abnormalities were observed in the acoustic distributions. The uvula was in the center, moved well; the pharyngeal reflex, however, was slightly diminished. The tongue displayed a faint tendency to deviate to the right. There was present a fine rapid tremor which was not indicative of fibrillations. The movements were normal.

The muscular power of all four extremities and the head and trunk were normal at the time of the examination. The right lobe of the thyroid was noticeably enlarged, soft, and extended below the clavicle on deglutition. The teeth evinced some signs of early pyorrhea. The heart and lungs were normal. The blood pressure was 140 systolic and 90 diastolic. The pulse was 70, respirations 20, and the temperature 98° F.

The urinalysis was as follows: reaction acid, specific gravity, 1027; albumin and sugar were absent. The microscopic examination revealed a few pus cells and a few mucus threads, also an occasional epithelial cell. The blood picture was 4,300,000 red blood corpuscles, 8,500 white blood cells, polynuclears 65 per cent, lymphocytes, including large and small, 35 per cent. The hemoglobin was 80 per cent (Dare), and the color index 0.9+. The blood Wassermann reaction was negative to both antigens. The urea nitrogen was 17 mgms. per 100 c.c. in the blood, the creatinine 1.4 mgms., and the sugar 0.11 per cent, calcium 7.8 mgms.

COMMENT

The involvement in this case was limited to the muscles of the upper and lower extremities, chiefly to the latter. None of the pupillary and ocular signs that have been described were present. Many observers have reported various cardiac irregularities in the form of murmurs, tachycardia, dilatation of the heart, irregular pulse, etc. Occasionally paresthesias have been reported. In my case none of these signs were observed. On the other hand an enlarged right lobe was present in my patient. He refused to remain in the hospital sufficiently long enough to have performed upon him the Goetsch test to determine the presence or absence of vagatonia or

sympathicotonia in order to conclude whether the enlargement of the right lobe of the thyroid bore any relationship to his condition and whether an etiological factor could be ascertained. In all probability the associated thyroid hypertrophy is merely coincidental rather than possessing any undue significance as far as etiology is concerned.

Various alterations in the blood pictures have been reported such as leucopenia, lymphocytosis and eosinophilia. The blood sugar has in a few instances been slightly increased. Neustadter found increased calcium in his case, in fact it was the highest reported in any case (20 mgms. per 100 c.c.). This patient had a normal calcium content but the test was performed during the interval stage.

In the urine transient glycosuria and diminished urea output were noted. Acetone and increased uric acid were occasionally found.

Premonitory symptoms of impending attacks have not been observed in this individual. Prodromal symptoms are as a rule absent but in the above case a feeling of fatigue ushered in one attack (muscle pain). Neustadter noted headache associated with perspiration; these were not found to be concomitant in my case.

The literature has been carefully reviewed by Neustadter,¹ also by Faville and Rennick² and the reader is referred to both of these authors for bibliography and discussion of the present-day theories.

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SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

THE FOUR HUNDRED AND FOURTEENTH REGULAR MEETING OF THE
NEW YORK NEUROLOGICAL SOCIETY WAS HELD AT THE NEW
YORK ACADEMY OF MEDICINE, TUESDAY, OCTOBER 7, 1924,
AT 8:30 P.M., THE PRESIDENT, DR. E. G. ZABRISKIE,
IN THE CHAIR.

The following program was carried out:

PATHOLOGICAL PRESENTATION: A CASE OF CORTICAL TUBERCULOMA WITH OPERATION

DR. LEWIS STEVENSON (Author's Abstract)

This young man of twenty was sent to Dr. Foster Kennedy's service in June by Dr. Sylvester Leahy. Dr. Leahy's history shows that one year ago he was complaining of cramps in his left hand and was unable to open his hand to let go of a hammer which he was using. This happened several times, but passed off always in a few moments. In April, 1923, ten days after the onset of symptoms, the patient lost consciousness suddenly, fell, and stiffened out. The next morning he had another cramp in the left hand, "which was raised slightly and then fell down"; there was no loss of consciousness. A few hours later he lost consciousness, fell, and had twitching of his left arm and leg. Since then he has had a number of convulsions of Jacksonian type, involving left leg and left hand.

The previous history shows he had a paralysis of one arm and leg at the age of two years (side not remembered), but the trouble did not last long. Otherwise past history and family history are negative except for some headaches. On admission to Bellevue, in June, the neurological examination showed the following: Bilateral papilledema; definite weakness of left leg with considerable weakness in plantar flexion at the ankle; abdominal reflexes normal; Babinski positive on left; spinal fluid clear, no excess globulin, cells, 23 lymphocytes per c.c., sugar 40 mg. per 100 c.c.; Wassermann negative in blood and spinal fluid; X-ray of the skull negative.

The patient was operated upon the 22d of July and a tumor removed from the cortex of the right hemisphere in the region of the motor area for the leg. It resembled a conglomeration of peanuts as in peanut brittle and measured $1\frac{1}{4}$ " x 1" x $\frac{3}{4}$ ". It was readily enough shelled out of its bed in the cortex of the brain. On microscopical examination many typical tubercles and giant cells were seen. No tubercle bacilli were found in sections stained for them.

The mother's blood gave a negative Wassermann. The long bones of the patient showed no lesion when X-ray plates of them were made and there was no evidence whatever of lues in the patient.

Immediately after operation the left leg could not be moved; paralysis of the left arm also developed. There were no sensory disturbances before or after operation and no astereognosis. The patient still has a left-sided hemiplegia and occasional Jacksonian fits, involving the left face and left arm but apparently not the leg.

Discussion. Dr. Sachs: In this case were not symptoms of frontal lobe tumor shown? The question was whether the symptoms were caused by a tuberculoma; also whether the growth should be treated by X-ray or radium. These tuberculomata are not rapidly fatal.

Dr. L. Pierce Clark: There was undoubtedly degeneration of the convolutions due to increased cranial pressure, and this produced transitory symptoms as well as discharge convulsions. To that extent it throws some light upon the convulsive phenomena, but it could not in any sense be looked upon as being of interpretive value in regard to essential epilepsy as such.

Dr. S. P. Goodhart: As a rule we should hesitate to operate on the basis of the symptomatology presented in this case. If we expect to find frontal lobe tumor we should look for signs of psychic disturbance. In this case the finding of choked disc decided the diagnosis.

Dr. Kraus: What is the pathway of infection in this case? Why is it tuberculoma and not tuberculous meningitis? Tuberculoma involves the brain stem through vascular channels. Meningeal infections go through the lymphatics. I wonder why there appeared in this case so unusual a finding as tuberculous tumor of the cortex. Of course cortical arteries are end arteries, as they are in the pons, but why did not the boy develop tuberculous meningitis?

Dr. Elsberg: I think this is a very interesting and instructive case. Tuberculomata of the central nervous system are relatively rare. I know that there have been only a small number of cases of tuberculoma of the spinal cord found at operation, and a larger proportion at autopsy; I do not know the exact number. The lesion is more frequent in the brain stem and cerebellum, and is more often found in children. A smaller number occur in the hemispheres. I have seen two tuberculomas, both of which were hard, solid tumors, similar to the endotheliomata or meningiomata. In one patient the tuberculous nature of the growth was in doubt until intensive pathological studies had been made. In this patient, in spite of a negative Wassermann, the tumor was at first called a gumma. At one time Cushing made the statement that all patients with tuberculomas died in a short time from secondary tubercular meningitis, and that he had never seen a patient who had been operated on recover permanently. At that time I was able to refer to two cases of tuberculoma of the hemispheres who recovered after operative interference, and both patients were well two years after the operation. Since that time numerous other reports have been made of cases where tuberculoma has been removed from the cranial or from the spinal cavity without recurrence, and

without meningitis. It is now the generally accepted opinion that tuberculomata of the spinal cord are intramedullary; that when they occur in the hemispheres they are often cortical growths and often adherent to the dura. Tuberculous lesions in the brain stem cannot be subjected to surgical therapy. When found in the cerebellar hemispheres, secondary tubercular meningitis is frequent, but not as frequent as it was once believed to be. I have recently operated on such a case at the Neurological Institute. Neither this patient nor others that I have operated on developed meningitis; so that meningitis is not a regular complication. When the tumor occurs in the spinal cord or over a cerebral hemisphere it is easily removed. In the cerebellum these growths often occur in the near vermis, and this is the form that is least satisfactory from the standpoint of surgical treatment.

Dr. Stevenson (closing): I must apologize for not having more accurate data on the exact localization of the tumor. I was depending upon Dr. King. I thought he would describe the exact localization. I was interested mainly from a pathological standpoint. I do not think that perhaps we would have operated, certainly not so quickly, if we had not had choked disc. It was found that there was double choked disc, and with Jacksonian epilepsy and lymphocytes in the spinal fluid it was thought probable the tumor was in the cortex producing pleocytosis by irritation of the meninges. I have not yet demonstrated tubercle bacilli in the tumor. It may be possible to do so. I do not think this is syphilitic. I think it is tuberculous. The giant cells just under the pia are very suggestive of it. The multiple small miliary tubercles are typical of tuberculosis, rather than of syphilis.

SOME PSYCHOLOGICAL DATA REGARDING THE INTERPRETATION OF ESSENTIAL EPILEPSY

(A preliminary communication, for discussion, suggesting a new insight into the significance and meaning of the disease)

DR. L. PIERCE CLARK

In previous papers I have pointed out that essential epilepsy is characterized by no constant or enduring lesion of the nervous system. When a certain lesion is present it is most likely to be a result of the general process of deterioration, constituting, as it were, a symptomatic pathology, and not in any specific sense a real cause of the disease. The great majority of researchers in this field freely admit that the most signal defect is a peculiar type of mental and physical deterioration. This is shown in a characteristic distortion and enlargement of the ego. Most intensive studies have been presented to show that these outstanding mental characteristics exist long before the disorder is recognized clinically. In a long series of careful records, the main characteristics of the epileptic make-up were found to exist even from birth. We see in this rigidity of the whole personality the dominance of egoistic traits that might be spoken of

as a specie of epileptic behavior-pattern in its broadest sense. We find the most glaring faults bear a striking resemblance to those seen in compulsion neurotics, and in the precox. In brief, the main traits of sadistic cruelty and hate, penuriousness, pedantry, and forms of piety and zealotry are but the crudest forms of narcissism, supersensitiveness, and emotional poverty.

Sufficient studies have been made upon the ego-neurosis, and especially upon the narcissism in the compulsion neurotic, to show that the gastrointestinal and hypochondriacal states are due to the presence of homosexual trends that exist either in excess or are very poorly repressed.

Many have questioned whether the character-defects alone, in their social discord, are sufficient to cause a later and enduring epileptic state. They cite the presence of similar personality faults almost as marked in other types, and yet epileptic reactions do not follow. Even so, it is the singular dominance and almost exclusive or pure culture of these character traits in the epileptic that make their presence of such dire consequence. Moreover, these dominant traits no longer rest upon a trend of seemingly detached character faults, as formerly stated, but they have their origin in the deepest unconscious, and in the very organic substratum of the whole organism. In other words, the epileptic character is an outflow from a homosexual component which is not acceptably sublimated. While traces of this homosexual component may be shown in the epileptic physique, as might be expected, it is not so dominant, perhaps, as in the precox. The mental characterizations are not directly of the homosexual type. How, then, is this component revealed? It may be said that it is present in the epileptic's peculiar type of narcissism. The narcissism of the epileptic is similar to that shown in the compulsions, but is of a much cruder pattern. What clinical evidence do we possess that the libido is inverted in the epileptic? Contrary to the popular belief, the epileptic is not sexually aggressive. As a class they may practice onanism and may occasionally indulge in illicit relations during adolescence. Whether married or otherwise, their sexual life is not extraverted after early adult life. It usually ceases at twenty-five or thirty years of age. The main strength of the libido is turned back upon the ego, building larger and larger the innate narcissism.

The seeming early asexuality of the epileptic was attributed to the fact that they were closely interned and that sedatives were continually administered; but in the absence of both these factors asexual phenomena were still in evidence.

Let us make a slight digression and see how the mechanism of sex-inversion comes about. According to Freud, the two determining factors in the production of homosexuality are the love for the mother and the love for one's own body. These two components are invariably present and stand in the relation of contrast to each other, the narcissism being a result of the repression of the mother-ideal. That is to say, the individual rids himself of the mother-image as the love object by identifying himself with her, and substitutes his

own person as the sexual or love object. Later, through an association of similarity, he extends his object to include other persons of his own sex. Thus we have the mother-identification giving way to narcissism as the first step, the narcissism yielding homosexuality as the second. Burrow's concept, which is a modification of Freud's, may be stated as follows: The child, of either sex, is strongly identified with the body and person of the mother before and for some time after birth. At the time of birth it begins to reduce the oneness or identification with the mother, but before a full separateness is attained the child gradually swings its attitudes of attachment from the mother to its own body and person. It loves itself, not only because it is pleasurable and the immediate object at hand, but because the identification with the mother follows the love-concern of the mother, which, in the growing child's mind, is the mother's love for his body and person. When the subjective or mother-identification state exists beyond a certain strength and duration, the psychic system remains strongly infantile, emotional, and introverted. If the child is a male, the tendency is to develop mentally in a feminine way, and *vice versa*. Thus, if we may disregard the biological inheritance, there is a distinct psychological reason for homosexuality. In later life such an individual completes his psychosexual union with someone who is more like himself and who better personifies himself; that is, his object love is unconsciously homosexual. If this unconscious trend is not sublimated into acceptable channels he then becomes a potential candidate for a neurosis.

The whole problem of the epileptic is not one of overt homosexuality nor one in which the fit is a libidinous discharge. It is far more subtle. As a class, homosexuals are not recruited from the epileptic group. The early repression of the main homosexual trend probably never, or rarely, reaches consciousness. In point of fact it only becomes dynamic in producing epileptic reactions when it is deeply repressed or strangled in the infantile unconscious.

The fit is a protective and regressive mechanism. It relieves the previous organismic tension and almost invariably either removes or makes amnesic the stress-factor which wounded the unduly taxed narcissism. From a therapeutic viewpoint it may practically be said that there exist but two main trends in the epileptic's libido—the heterosexual and the homosexual—and that no epileptic is without some factors of the heterosexual culture or behavior pattern. Providing natural outlets for development of these strong primary homosexual and narcissistic trends in self-expression and personal ambitions is the easiest and immediate therapy. The more important principle is to encourage the development of the heterosexual trends of culture and behavior that lead to acceptable socialization. Unfortunately ordinary psychoanalysis is of little use. Most frequently the heterosexual trend is so slight that these individuals can make no proper transference. When it is established it is based upon such an infantile level as not to permit of adult socialization. Again, the narcissism so sensitizes the epileptic that he practically becomes too deeply inhibited and is unable to awaken infantile memories. Though the

verbal and even occasional visual memories are recovered, they are usually attended by no affect, and but little is accomplished, as is the case with the precox. Any modified analysis is extremely slow and tedious.

To summarize: I submit that the epileptic make-up has its roots in a narcissism which is based upon a repressed or illy repressed homosexuality. It thus places the dynamic defect in the imperfect colligation of the two contrary trends in the sex instinct, and the dominance of the homosexuality and its incomplete repression are transformed or manifested by narcissism. The details of clinical data to support this tentative hypothesis will be presented at another time. Just what other factors are entailed in this imperfect development of the sex instinct—an epileptic in one instance, a paranoiac, a precox, or a compulsion neurotic in other instances—are problems calling for our most careful research.

Discussion. Dr. Walter Koenigsberger, Berlin, Germany (by invitation), said: The speaker, while elaborating a theory, gives us no data from which rational psychological deductions can be drawn. One might reasonably ask for case material from the results of observation and treatment along lines suggested. Before Dr. Clark can bring such a theory with emphasis we may ask for psychoanalytic examination and then the case reports, conclusions. Epilepsy has both physical and psychic phenomena. To ignore the probable and generally recognized rôle of physical and chemical agents, and to see only symbolism and the rôle of the psyche, is asking much of credulity.

Dr. Smith Ely Jelliffe: I have listened to Dr. Clark very attentively. I want to know what he means by "A New" psychological interpretation. When he speaks of the desirability of viewing the essential epileptic so far as a constitutional personality type as wedged between the compulsion neurotic and the dementia precox types, I can state that in 1915 Dr. White and I put it there in our textbook. We thought that the closest alliances of the epileptic were with the compulsion neurotic and dementia precox groups. Therefore I feel sympathetic to that aspect of the problem. Second, I find no fault with the general thesis of the homosexual libido fixation idea but I do not see anything *new* in that. We have been thinking of the essential epileptic in that way for some time. In regard to the unconscious homosexual trends we can concede that that generalization is valid. I would like Dr. Clark to emphasize the affective effort on the part of the individual to get his material over through the cardiovascular system. I think Dr. Clark is right in speaking of the stomach and gastrointestinal system as being involved in homosexual identification factors. When he says that the fit is not "libidinal" I distinctly disagree, and could cite numerous instances to show incestuous activities. The physiological mechanism of the convulsion is centered largely on the vascular imbalance. I think that no one here who has had experience with either overt or unconscious expression of homosexual components will deny that the cardiovascular system bears the brunt of the repressed tension. I would like Dr. Clark to

speak of that in detail and refer to Lewis's work on the cardiovascular system changes in dementia precox and in paranoia, respectively.

I cannot add anything further to this discussion. I feel in definite sympathy with the point of view, and I feel a certain amount of optimism in regard to the psychoanalytic treatment of the essential (I prefer the term "psychogenic") epileptic. I do not know any other method which we can use, and I approve of the modification Dr. Clark has suggested in aiding the patient towards heterosexual transfer of his libido. This was a point I brought out in an address before the American Psychopathological Society in May, 1918.* One of the points there touched on regarding the sex of the analyst might be of service in getting one over hard spots, a view which Freud himself spoke of later in his paper on homosexuality in women. I do not agree that the interpretation of the symbolism of dream analysis is not helpful in the therapy of epileptic cases. I think it can be utilized to still further aid the affective realization towards the heterosexual goal. That the amnesia may be profound everyone recognizes. That the transference is very infantile also is often true. That type of infantile transference which is constantly shifting is one of the greatest difficulties in the therapeutic attack upon the patient.

Dr. Philip R. Lehrman: I wish to point out the unity of mental phenomena in reference to reality. The symptoms of psychoneuroses, psychoses, and essential (psychogenic) epilepsy indicate not only the intensity of the unconscious strivings but the necessity of the manner and degree of the withdrawal from reality. Thus a partial withdrawal is seen in the psychoneuroses, a complete withdrawal is seen in the psychoses, and a sudden withdrawal is seen in epilepsy. The various mental symptoms are attempts at reparation and correspond to the need for a balance between the unconscious strivings and the interference of reality. The partial success of the sedative drug therapy in epilepsy can be accounted for when we bear in mind that these drugs partially accomplish what the symptoms attempt to do—they partially withdraw the patient from reality. Dr. Clark, however, directs his attention to the unconscious strivings which bring about the symptoms, and his studies are encouraging.

Professor Kemball Young, of the University of Oregon (by invitation): I regard this paper as significant as dealing with epilepsy from the point of view of psychology rather than that of medicine. Dr. Clark has laid down certain grounds by which we can understand the whole development of personality from the unconscious, motor, vascular and muscular reactions. I do not think we can add anything to his clinical data. Dr. Clark has made a decided advance in the study of personality from the beginnings which Freud laid down. I believe that all the beginnings of the mechanism which underlie the epileptic attacks lie in the roots of the unconscious and can never be recovered except by the study of the terms of the affect. When we understand compulsion and precox cases we get at the muscular and

* Contributions to Psychotherapeutic Technic through Psychoanalysis
Psychoanalytic Review, January, 1919, p. 12.

vascular reactions of the child to the mother, and the study of the uterine state also throws some light on the subject. This type of personality is an egocentric one, and we can throw some psychological light on it by study of the early reactions to show there is a gradation through the crude form of epilepsy to the compulsion reactions, and up to the reactions of the normal individual.

Dr. J. Rosett: I have little to say regarding Dr. Clark's description of the character of the epileptic. That the average human being is in possession of more cunning and cruelty than any other animal is attested by the historical fact that of all animals man is the only one who actually delights in inflicting misery and pain upon his fellows. Such being the case, the particular egocentricity of the epileptic is perhaps overemphasized.

Dr. Clark's assumption of deeply buried homosexual tendencies as a cause of epilepsy in those cases in which no pathological lesion was found in the brain appears to me as arbitrary. On the one hand it is impossible to see why a person with deeply buried homosexual tendencies would express them in the singular form of unconsciousness, rigidity, and convulsions. On the other hand, the absence of a lesion in the brain of the so-called essential epileptic has never been proven. The best that can be said in such cases is that by the sectioning and staining methods at our disposal we have been unable to discover it. As a matter of fact, how many such brains have really been carefully studied? Admittedly, very few. The usual procedure is to cut such a brain at autopsy in two or three places and, failing to discover a large tumor or a hemorrhage, to declare that nothing was found. Even the conscientious pathologist is satisfied with a microscopic study of but two or three cubic centimeters of brain tissue taken from as many different places. The number of studies made of such brains by means of complete serial sections can be counted on the fingers. The available testimony regarding the absence of structural abnormality in the brains of "essential" epileptics is indeed too flimsy to be even considered.

Sharp and MacLaire have made a discovery within the last year which appears to me as being of surpassing importance in this connection. They found blood in the cerebrospinal fluid of over 10 per cent of new-born babies. Blood in the cerebrospinal fluid signifies an injury to the contents of the craniovertebral cavity. It means that a large percentage of human beings have sustained at birth an actual trauma of greater or less magnitude to their central nervous system. The fact that in a large majority of such cases the damage will have disappeared from view when the tissue is sectioned and stained years later speaks for the imperfection of our methods. A damage of structure, however, implies an abnormality of function.

In the light of these facts the term "essential" epilepsy appears to me as highly irrational.

Dr. Osnato said: I do not think that anyone can quarrel with the statement that in a great many epileptics there may exist a highly important emotional factor. The interpretation may be what Dr. Clark says it is. Some of us who disagree may be pardoned for

having concrete organic conceptions. During the development of physical emotional reactions there are certain concrete physiological biochemical factors which have been worked out by James, Lange, Cannon, and Crile. There are certain chemical substances produced in emotional states which have been traced to the adrenal glands, the thyroid, the liver, etc. Recently Cannon has isolated a protein histamin-like substance secreted from the liver. Whether one explains the emotional factors on a purely psychological basis or whether one more satisfactorily explains them on the basis I have mentioned depends on the particular medical trend and point of view of the man making the explanation. The factor which produces the convulsion in epilepsy must work through the central nervous system. Whether this is produced in the central nervous system itself, I do not know. The reason we know so little about epilepsy, I am frank to say, is because neurologists have had so much to do with it. The trouble may not be in the central nervous system at all, and I am of the opinion that it is not there primarily. In Dr. Stevenson's case, presented to-night, the tumor itself did not cause convulsions until it was able to cause vascular disturbance in the cortex. Dr. Jelliffe has referred to cardiovascular disturbance as a strong factor in causing the epileptic convulsion. In this boy the seizures were caused by the tumor indirectly perhaps disturbing cortical blood supply, while in the epileptic it may be by chemical disturbances resulting from improper metabolism. Many poisons cause convulsions when injected intravenously or painted on the cortex. It is not necessary even to have a cortex to have convulsions. Convulsions occur experimentally with the cortex ablated. Disturbances such as hemorrhages, trauma, or neoplasm, at many levels from the cortex down to the medulla, may produce convulsions. Many mechanical or chemical factors may finally be found operating to produce the convulsion in epilepsy. In a small number of cases the emotional factor may be dominant, indirectly causing the seizures by producing toxic substances capable of disturbing the blood supply in the brain (histamins, proteoses, etc.). Only in this way can I agree that a study of subconscious emotional factors is of any importance in epileptics.

Dr. E. G. Zabriskie: Essential epilepsy is decreasing day by day. The field is smaller. Each day by improvement of examination methods we find fewer cases. In regard to Dr. Clark's statements about the psychoanalytical method, one of the main rules of psychoanalysis is not to construct an explanation or inject prejudice, but to show a series of cases with simply the treatment of the deep complex, as he pointed out. I think there may be functional disturbances of the brain at first, but these would not make the changes which are seen later. Dr. Hauswitz of San Francisco thinks that the protective cushion surrounding the brain stem may collapse, so that sudden compression of the vascular system occurs with consequent stoppage of circulation giving rise to sudden unconsciousness; thus an instantaneous deprivation of blood to the brain itself may cause the convulsion. I stayed at the Craig Colony to make observation on this subject. I thought that if the unconsciousness could be produced

by ligation of the basilar artery, with collapse of the watery cushion below the brain stem, the brain stem might become impacted against the bone at the base of the skull. The aura is said to make a sudden darkening before the eyes of the patient, which might be produced by closing off of blood coming to the eyes. Fifty per cent of patients speak of this darkening as reported in the textbooks, but at the Craig Colony I did not find one case with this experience. I feel that functional disorder may exist in the brain without making visible changes of structure.

Dr. Bernard Sachs: I came here this evening to get a new viewpoint. I have gone over this subject of epilepsy very thoroughly. The trouble is the same as with psychoanalysis. Starting with presumptions which are not proven, the author builds up a structure purely fantastic. Dr. Clark's personal experience is very large, but I do not think that he will be able to prove clinically that the vast majority of epileptics are homosexual, that they cannot be tempted into the heterosexual field, or that their libido is invariably improper; the epileptic behaves as the average human being behaves. Fortunately Wohlgemuth in his book has knocked the bottom out of these theories which we hear paraded around as though they were proven. I have tried to study these questions from the point of view of one interested in philosophy and psychology. It is difficult to follow the exposition of these theories that are obscured by a ridiculous verbiage. As a matter of fact there is no logical basis for the symbolism of psychoanalysis. Personally I should be glad if there were found to be an entire psychological basis for epilepsy, but I am more in sympathy with Dr. Rosett's views than with Dr. Clark's. I do not believe there is any epilepsy without cerebral disturbance, either due to structural changes in the brain or to vascular instability. I believe the emotional instability and deterioration in epilepsy is largely to be ascribed to the morbid process causing the epilepsy. Formerly we thought the use of drugs produced the mental deterioration. Now we give less drugs and we see less deterioration. There may be a disordered personality, but do not call every man who takes thought for his body a victim of narcissism. That is the latest catchword. Do not let the psychoanalysts continually talk "sex," "libido," "narcissism," and the like.

Dr. L. Pierce Clark (closing) said: In the complete text which I have worked out, documented by clinical cases, my main contentions held forth in this preliminary communication are fully supported. I wish to apologize for the word "new"—the material is not new, but its application is. I have been working on the subject of essential epilepsy for nearly as long a time as Dr. Sachs. I know the literature that covers the subject as regards etiopathology, and yet I am constrained to come to a different conclusion than Dr. Sachs! I believe the ultimate explanation of essential epilepsy will be found in a defect in the functioning of the organism as a whole, and not in any part reaction or resultant of alteration of bodily functions such as gastrointestinal and vasomotor disorders, muscular deficiencies, and general metabolic faults. One might ask, How are we to divide the

strictly so-called functional from structural processes? Any attempt at such a schematic conception is really worn out and is being rapidly discarded. Anything less than a dynamic explanation of the functioning of the organism as a whole must be discarded, and partial reactions can never explain essential epilepsy. In the psychoneuroses of the compulsion type and in essential epilepsy we must think of the individual as a living, functioning organism operating in its entirety through partial reactions, but not because of them. Blood or serological reactions in their turn have no significance except as they participate in the total reaction. For instance, paranoia is not a result of a lesion of the brain, nor are bad tempers; but these behavioristic reactions are fused into the individual as a whole. Even neurology and psychology fail to cover the whole field of the psychoneuroses. We must take into account the general concept of the individual as well as his relationships to environment. We must correlate the mind, body, and environmental relationships to gain any comprehension of the totality of the normal as well as psychotic behaviors. Subjective as well as objective data, when taken together, constitute as good clinical evidence as any so-called neurological science.

NEUROLOGY IN PARIS, 1923-24

DR. WALTER M. KRAUS

Dr. Kraus presented a paper describing the organization of neurology in Paris as well as the activities of various men there during 1923 and 1924.

The steps from student life to professor, the importance of such titles as "*Ancien Interne des Hôpitaux de Paris*" and "*Médecin des Hôpitaux de Paris*," as well as the distinction between "*hôpitaux*," "*hospices*," and "*asiles*," were described. The meetings and organization of the French Neurological Society, as well as the activities of various of its members during the past year, were described in brief detail.

The hospitals and laboratories at which work could best be done were outlined. The paper was intended to give a short chatty idea of things neurological in Paris at the present time.

CURRENT LITERATURE

HEREDITY, CONSTITUTION, GENERAL BIOLOGY OF NERVOUS SYSTEM

Federley, H. THE MENDELIAN LAWS. [Acta Medica Scandinavica, April 22, 1922, Vol. LVI, p. 393.]

In this general discussion the author presents the overconservative attitude of the critic. He outlines the many difficulties encountered in the study of human heredity. The main thing at the present time is to keep on compiling data, collecting material, and tracing family strains through generations. When sufficient data have been accumulated, research on heredity, he thinks, can proceed on a reliable basis.

Bier, A. MEDICAL THEORIES CONCERNING THE HUMAN ORGANISM. [Münch. med. Woch., June 9, 1922, Vol. LXIX, No. 23, p. 845.]

With practically all modern logicians, the author maintains that it is of little moment if an hypothesis (fiction) be true so long as it leads to valuable conclusions, or provides new modes of approach. Practically all thinking has proceeded along such lines. The darwinian hypothesis was not correct in every particular, but it proved exceedingly fruitful in the field of biology and in the realm of many other sciences. Bier admits that he is a teleologist. In spite of the many attacks against the teleologic theory, down through the ages, it has never been overthrown. Assertions that there are many dysteleologic processes and activities in the organism are being refuted more and more. But above all, and that is the main thing, the teleologic theory has also proved to be exceedingly fruitful of results, and, in view of the inadequacy of the causal theory, was needed to supplement the latter. In general, then, it should be recognized that theories are necessary. They constitute the best means of preparing the way for progress. "He who is inclined to despise them, let him recall that antiseptics, which has proved to be of such eminently practical value, was developed through theoretical meditation. Then, too, was asepsis developed through practice? No, rather through theory."

Sioli, F.; Meyer, A. KRETSCHMER'S "KÖRPERBAU UND CHARAKTER." [Zschr. f. d. ges. Neur. u. Psych., Vol. LXXX, Nos. 1-4.]

The authors speak with high praise of Kretschmer's book in a discussion of its detailed matter, giving close attention to criticisms brought against it by Scheidt in this same journal. They refer to facts discov-

ered by themselves which can be evaluated according to Kretschmer's theory of affinities between definite types of somatic structure and psychoses.

Buchanan, J. A. THEORIES AND THEORIZERS CONNECTED WITH THE DEVELOPMENT OF THE LAWS OF HEREDITY. [N. Y. Med. Jl., February 21, 1923.]

The problems of heredity have been divided into those comprising, (1) the precellular (? B.C. to 1838 A.D.), and (2) the cellular period (1838 to the present era). The precellular period is characterized by speculation and philosophical deductions from uncontrolled observation. The cellular period is characterized by experimental observations, deductions, and the establishment of fixed principles based on demonstrable facts that are capable of repetition. The essentials of many of the theories introduced in the precellular period are found in the modern principles of heredity; others have been proved false. This is true of teleony, transformism, and to a large extent of environment. The effect of environment is temporary, and as soon as individuals or races are returned to the proper environment there is a prompt or gradual return to a normal status. The theories of epigenesis and preformation have been recast in the theories of Wiesmann. The closing years of the precellular period marked the dawn of the experimental era in heredity. Kölreuter carried out his investigation on hybridization from 1760 to 1766. His experiments were but one step removed from the observations of Mendel.

The cellular period began with the work of Schleiden and Schwann in 1838. The approach to their work was paved by Pürkinje, Valentine, John Müller, and Henle. Von Kölliker linked cellular life with heredity when he demonstrated that testicular cells gave origin to spermatozoa. Spermatozoa were discovered by Leeuwenhock in 1677. The ovum was discovered in 1883 by van Beneden. Nussbaum recognized that these two structures were the fundamental vehicles for the transmission of hereditary characters. The event primary of the cellular period, so far as heredity is concerned, was the mating of hybrids by Mendel and the observation that parental types and hybrid types were segregated so as to give the pure types of the primary generation and the identical type of hybrid as was obtained from the first cross of the parental stems. From this observation Mendel's first law, "The Segregation of Character," was derived. His second law, "The Independent Segregation of Characters," was deduced from his experiments. The life of Mendel was characterized by a period of production, his early life, and a period of contention, his later life. He gave the world the most important laws of heredity during the early years of his life.

Since the discoveries of Mendel four other laws of heredity have been recognized: (1) linkage, (2) linear order of genes, (3) interference, and (4) limitation of linkage. A corollary to linkage has been recog-

nized and is known as "crossing over." Linkage limits Mendel's second law. These newer laws may be wholly or partially true, or they may be purely the product of minds that see simple things in a complex way.

The clearest analysis yet introduced concerning the final heredity units is contained in Wiesmann's "Theory of the Germ Plasm." Biologic differences in plants, animals, and man, which are hereditary, are spoken of as "characters."

The physicobiological characters which are transmitted to subsequent generations by means of the germ plasm furnish the concrete basis for studies in heredity. A biological character signifies the possession of the physical and chemical composition by which individuals may be differentiated. Characters are rendered physically immortal by heredity, and the study of heredity becomes in consequence an investigation of the mechanism of physical immortality. Physical characters become extinct unless perpetuated by heredity. The vehicles on which the transmission of the characters depends are the nuclear structures, chromosomes, in all germ cells, and in certain instances the cytoplasm of the germ cells. The hereditary substances in the chromosomes and the cytoplasmic structures together comprise the germ plasm. The germ cells or gametes in man are the ova and spermatozoa. Heredity never deals with the etiological factors for disease. Any characters appearing in man that can be proved hereditary are normal, biologically speaking, regardless of how they may make him unfit for harmonious coöperation in the economic and social program. By heredity the quantitative and qualitative characters in all bisexual species are kept extant and limited. Under similar conditions of reproduction, the numerical expression of the transmission of these characters follows very closely, or is reducible to, a fairly definite ratio. An hereditary character is always wholly hereditary, and not hereditary on a percentage basis. The science of heredity includes the study of the intermediate as well as the immediate stage, corporal stage, of certain features of the life cycle. The ova and the spermatozoa form the intermediate stage of the life cycle in man. The rearrangement of chromosomes which occurs following their union furnishes the fundamental basis for the study of the tangible evidences of heredity in the immediate stage of the life cycle.

The term heredity as ordinarily used by medical writers means the presence of a like condition in parent and child. This occurrence is usually described as one of the etiological factors of the disease under consideration. This conception of the science of heredity is too limited and often results in the publication of data which in no way conform to the definite principles which invariably govern the transmission of hereditary characters. The only laws of heredity that have been demonstrated in man are laws 1, 2, and 3; in man, of course, there is no hybrid in the strict sense. The absence of the hybrid generation renders insignificant the terms dominant and recessive, as they are determined by the type of hybrid. [Author's abstract.]

Mott, F. EVOLUTIONAL LEVELS IN THE NERVOUS SYSTEM. [Lancet, 1922; Edit., N. Y. Med. Jl., January 3, 1923.]

Sir Frederick Mott, writing in a recent number of the *Lancet* on Body and Mind: the Origin of Dualism, includes an interesting and illuminating discussion of the doctrine of Hughlings Jackson's levels. Mott says: "We may consider that there are three evolutionary levels in the nervous system, and this hypothesis is supported by comparative anatomy and the effects of functional and organic disease of the nervous system. The lowest level is present in all animals and subserves the primal instincts of self-preservation and preservation of the species. It consists of two parts: 1, the *vegetative nervous system*, consisting of two systems, a, the involuntary autonomic or parasympathetic, and, b, the sympathetic, with which are associated the ductless glands, and which controls and directs the bodily needs and functions concerned with gratification of the appetites and desires connected with the instincts of self-preservation and propagation; 2, the *protopathic sensorimotor nervous system*, which controls the reflex activities for protection against pain and injury, including injurious degrees of heat and cold.

"The second level is the discriminative *sensorimotor level*. In the vertebrate series, we find two great groups: 1, macrocosmatic, in which the nervous structures that are especially developed are those connected with smell and taste; and, 2, microcosmatic, in which the senses of sight, hearing and touch are especially developed. The archicortex of the cerebral hemispheres is highly developed in the former, the neocortex in the latter. The projection centers of these senses are around the primary fissures.

"The third highest level is the *psychic level*, in which there is a great development of the cortex of the brain, and which in man far exceeds in development that of the largest anthropoid apes. *Pari passu* with this great development of the cerebral hemispheres is a bodily development far surpassing in excellence all the lower animals: viz., erect posture—by which the forelimbs are no longer used for progression—and perfection of the hand, whereby it becomes, not only the instrument, but the instructor of the mind, for, guided by vision, it is enabled to create and make the most of varied mental adjustments to environment and control the forces of nature. By the creation of graphic and articulate language, which have simultaneously progressed, has been built up a great social heritage constituting an endowment to civilized man, whose organ of mind is, however, no larger nor heavier, and possibly potentially no better than that of the men who dwelt in caves 50,000 years ago, whose only common mode of expression was, it may be conjectured, mainly by vocal sounds, gestures, and facial expression, a primitive, universal, emotional language, understood by all peoples.

"Now, in idiots who are incapable of articulate expression and abstract thought, we find only the two lower levels properly represented;

the development of the anatomical basis of psychic level—*i.e.*, the millions of cells in the cortex—is arrested in development and we have a condition, then, of amentia or absence of mind. If we examined sections of the cortex, we should find the supragranular layer of pyramids especially affected. This layer, as Bolton has shown, is developed later than the infragranular layer. Moreover, I have shown that, as you rise in the zoölogical scale of vertebrates, it is this layer that increases in depth and number of cells. Simple dementia or loss of mind may be associated with a limited destruction of the anatomical basis of mind—*viz.*, the highest psychic level—and, the two lower levels being more or less intact, the habitual acquired sensorimotor reactions may remain and the individual then may behave as an automaton in response to environmental influences and bodily needs. Every part of the body is represented in all the three evolutionary levels, and, as Hughlings Jackson taught, the last to come evolutionally is the first to go. The three physiological levels are functionally interdependent. The highest level, upon which awareness and volition depend, is able to act through the second discriminative sensorimotor level to alterations in the streams of sensation from the external world; while the third and lowest level evolutionally is concerned with the involuntary vital functions of the body, and therefore constitutes the basic source of the desires and impulses connected with self-preservation and propagation."

Mourgue, R. CURRENTS OF BIOLOGICAL THOUGHT IN FRANCE AT THE END OF THE XIXTH CENTURY AND THE IDEAS OF RISUEÑO D'AMADOR. [Revue de Médecine, May, 1922.]

This work formed the subject of a brief communication before the second International Congress of the History of Medicine (Paris, June, 1921), but it was written on the occasion of the seventh centenary of the Faculty of Medicine of Montpellier (November, 1921). In these memoirs we have tried to show all the interest that is attached, in spite of the statements of certain authors, to the work of a physician of Spanish origin who occupied the chair of general pathology at the Faculty of Medicine of Montpellier from 1837 to 1849. While thus engaged there has been opportunity to reveal the state of medical and biological thought of that epoch. This has given occasion to indicate in a concise manner certain characteristics in the work of Barthez, which we still study after many years and in which we see essentially a fusion of classic hippocratism with the Newtonian philosophic thought of the 18th century. We emphasize because of the interest which they present from the biological point of view, the works of certain physicians and chemists (Lavoisier and Chevreul).

The work of Risueño d'Amador appears then well characterized on one hand by his concern for objective observation the triumph of which he sees in the results of pathological anatomy, but this is only a prelim-

inary approach. Anticipating the thought of the present day, and giving certain definite examples (tuberculosis), he sees in biological chemistry the essential instrument of scientific medicine. [Author's abstract.]

Haldane. BIOLOGICAL FOUNDATIONS. [Ed., Br. M. J., March 3, 1923.]

Dr. Haldane, whose lecture on the fundamental conceptions of biology we print in this issue, has for many years devoted himself with conspicuous success to the investigation of the incredibly delicate mechanism by which the regulation of various physiological processes is effected in the animal body. When, therefore, we find him taking his stand against the mechanistic interpretation of life so familiar to physiologists at the present day, we must recognize the fact that he speaks with the authority derived from experience, and that his views are entitled to the most careful consideration. It is not altogether easy, however, on the basis of a single lecture, to determine exactly what those views are. There seems to be something rather elusive about them, and some will probably think that he is abandoning the safe ground of experimental science for the less secure foothold of metaphysics.

Dr. Haldane emphasizes the fact that biology is an independent science, of which physiology is one department—a fact that is too often lost sight of at the present time. The living organism, he tells us, is a whole which is something more than the mere sum of its parts, and must be studied and appreciated as such. No chemical and physical interpretation of its behavior, however detailed, can give us a real insight into its nature. We welcome this reaction against the extreme materialistic tendency of some contemporary writers, but at the same time we cannot help thinking that he rather overstates his case, as when he tells us “that with neither the scalpel nor microscope as applied to dead organisms could structure be found that was capable of throwing light on any fundamental physiological activity.” The remarkable nuclear phenomena accompanying cell division—to take only one illustration out of many—have surely thrown a flood of light upon the physiological activities involved in the processes of heredity, and yet these phenomena have been revealed to us almost exclusively by the microscopical study of dead organisms chemically treated. Possibly, however, the processes of heredity as thus revealed are not, in Dr. Haldane's opinion, fundamental. Perhaps nothing that is really fundamental is accessible by the methods of experimental science; but if so, biology, which depends entirely upon observation and experiment, can hardly be said to have any fundamental conceptions at all—for these we must look to metaphysics.

Although we by no means think that mechanistic interpretations can ever afford a complete explanation of the living organism—or of anything else—yet it seems to us that they can take us a good deal farther than Dr. Haldane seems disposed to admit. He says that the mechanistic theory of life involves us in meaningless absurdities; but surely this is true only when it is pushed to a supposed finality. There is nothing neces-

sarily absurd in a mechanistic theory of development. There is no need to suppose that the whole machinery of the adult organism is represented in some way in the fertilized egg. We need only assume that the germ plasm, being part of the same stock, is similar to that of previous generations, and that it is exposed during its development to similar conditions. The machinery develops gradually, as the result of the interaction between the developing organism and its environment, internal and external. The marvel is that the complex processes involved are regulated with such accuracy as to lead to practically the same result generation after generation. It is this wonderful power of regulation that constitutes the chief distinguishing feature of the living organism. The vitalists attempt to explain it by postulating a special vital force, which leaves us exactly where we were. Nor does the hypothesis of an indwelling soul help towards a scientific explanation. The mechanists alone are in a position to push the scientific analysis of vital phenomena to its farthest limits. Those limits have not yet been reached. In any case it must be left to the metaphysician to speculate as to things that are fundamental.

That the living organism is something more than a mere machine we can hardly doubt when we consider the phenomena of consciousness and intelligence as manifested in ourselves. At what point in the scale of evolution consciousness began to emerge we do not know. Nature knows no beginnings, only change. Dr. Haldane would exclude "the distinctive characters of conscious responses as such" from the domain of biological science and hand them over to psychology. But surely consciousness is the culminating manifestation of life, and if psychology is to make any progress as a real science it must be as a department of biology. What Dr. Haldane is really aiming at is the reestablishment of "the spiritual interpretation as the supreme interpretation of our universe." This is in no way inconsistent with the mechanistic interpretation of the living body. Science can never hope to explain anything completely, but that is no reason why she should not carry her explanations as far as she can. The wonderful progress in medical science, for instance, during the past century has been due almost entirely to mechanistic methods of thought and investigation, and the more these methods are developed and perfected the better will it be for the bodily health of the human race. The spiritual health is another, though a closely connected, problem, and perhaps a more important one, but it can hardly be dealt with in the same manner. From the broader point of view, however, nature and spirit are one, and there is really only one science, which we attempt to subdivide for our own convenience and in accordance with our own narrow limitations.

We could wish that Dr. Haldane had had time to elaborate his thesis from the evolutionary point of view, for it is to the study of evolution, in its broadest aspects, that we must look for more light upon the meaning of life. From this point of view the distinction between the living and the not living tends to disappear, and we find ourselves face to face with a continuous sequence of events that probably stretches back without

interruption from the organic into the inorganic world. It would appear that as matter gradually acquired an ever-increasing complexity of structure, accompanied by repeated integration of lower units to form higher ones, so it gradually acquired new properties, new methods of energy exchange. Each new product of integration was something more than the mere sum of the integrated units, and exhibited a characteristic behavior of its own. At a certain stage of evolution, marked by the appearance of those extremely complex chemical substances which we call proteins, matter began to exhibit those particular energy relations which we have agreed to consider as distinctive of living things. One of the results of these complex energy exchanges between living matter—"protoplasm"—and its environment has been the further integration of units to form individual organisms, and the maintenance of its individuality, in spite of the disruptive tendencies of the environment, is, as Dr. Haldane rightly points out, one of the most distinctive features of the organism.

Dr. Haldane lays much stress upon the relativity of vital phenomena. The organism and its biological environment are inseparable, and exist only in relation to one another. To say, however, that life is not localized within the living structure of an organism appears to involve an extension of our ideas of life that would take us outside the customary limits of biological science. But, as we have already indicated, it is impossible to divide the field of knowledge into self-contained allotments. The chemist and physicist are concerned primarily with the inorganic world. The biologist is concerned with the world of living organisms, but he is bound to make use of the methods and interpretations of chemistry and physics to the very limit of their applicability. The speculations of the metaphysician must be based upon the results accumulated in all departments of science.

Moore, A. R. MUSCLE TENSION AND REFLEXES IN THE EARTHWORM.
[*Journal of General Physiology*, Vol. V, pp. 327-333.]

The author uses magnesium chloride anesthesia of the cuticle and shows that locomotor peristalsis of the earthworm can be initiated by muscle tension alone. He suggests that the receptors for the reflex are the ventral-lying intermyal sensory neurons described by Dawson. This is borne out by the experiments of Straub and of Budington. Straub found that the tension reflex could still be obtained when the nerve cord alone was removed, but Budington showed that excision of the myodermal strip underlying the cord with the cord resulted in complete loss of the tension in the rest of the musculature.

The author goes on to point out that the intermyal receptors are the receptors of a reaction first described by Morgulis in which passive unilateral tension of the posterior part of an earthworm induces active homolateral tension of the musculature of the anterior segments and results in the course of progress being brought into line with the enforced

orientation of the tail. Author terms this reaction the homostrophic reflex. The receptors for the reaction are distributed throughout the entire length of the worm, but the effector mechanism is limited to the anterior 15–20 segments. The impulses for the homostrophic reflex are conducted by the ventral nerve cord, since section of the cord anterior to the zone of flexion prevents the reaction from taking place.

It is pointed out that the homostrophic reflex in the earthworm is analogous to similar reflexes shown by vertebrates. For example, Lyon observed that if the head of a specimen of *Mustelus* be held immovable while the tail is bent to the right, the result is a forward rotation of the right and a backward rotation of the left eyeball. In other words, the eyes move as if the animal were to run a course parallel to the position of the tail. This, it will be noted, is exactly analogous to the body positions assumed by the earthworm as the result of unilateral tension.

The homostrophic reflex plays a subordinate rôle in the orientation of the more highly differentiated forms, the greater part of the work of determining the position in space being taken over by the semicircular canals, statocysts, or light receptors. In earthworms, on the other hand, where georeceptors are absent, this form of muscular coördination must be a device of first importance. As to the question of the relation of the homostrophic reflex to tropisms, it can be said in general that they are complements of each other. The tropisms constitute a class of responses of the organism to external forces and the homostrophic reflex is the reaction of the animal to its own internal tensions. Consequently, every turn of the body in response to a momentary external force carries with it its own correction, and the animal continues its course without great deviation. For this reason any permanent alteration of the path by reason of tropistic orientation of the earthworm can occur only when the exciting cause is a force constantly applied. It is also of interest that in a comparatively simple form, such as an annelid, muscle tension profoundly affects the processes of the central nervous system, and that such tension exerts a determining effect on a major activity of the animal—locomotion. [Author's abstract.]

Parker, G. H. THE INSTINCTIVE LOCOMOTOR REACTIONS OF THE LOGGERHEAD TURTLE IN RELATION TO ITS SENSES. [Journal of Comparative Psychology, Vol. II, No. 5, pp. 425–429, October, 1922.]

When newly hatched loggerhead turtles are put in the water, they swim either on the surface with a paddling movement in which the diagonal legs strike at the same time or under the surface with a symmetrical movement of the fore flippers like a bird in flight. In surface paddling and in submarine flight the young turtles maintain a balanced position. If by accident they are tilted to one side, they quickly right themselves by an unsymmetrical movement of the anterior flippers. When a young turtle is held between the fingers and in a horizontal position, the flight movements of the flippers are commonly carried out.

but if during these movements the turtle is turned with one side down, righting movements appear with almost machine-like regularity. The fact that these locomotor responses, including righting, are carried out with great precision and completeness by young turtles immediately on hatching shows that such responses are unquestionably instinctive. If a band of black silk is tied round the head of a young turtle so as to close its eyes, all the locomotor responses occur on changing the position of its body as they do when the eyes are open. These responses occur also in complete darkness. Hence the eyes are not essential in responses to change of position. Plainly touch is also not concerned. If the internal ears are destroyed, the whole system of responses is disorganized. When placed in an aquarium turtles thus operated upon commonly exhibit violent rotary movements. Such animals may be held sidewise without exciting a righting reaction and irregular righting movements are carried out at times when the animals are in a balanced position. In consequence it is concluded that in young loggerhead turtles normal position and the types of locomotion concerned with maintaining it are dependent upon sensory impulses from the ear rather than upon those from the eye or from the organs of touch. [Author's abstract.]

Cole, William H. CIRCUS MOVEMENTS OF *LIMULUS* AND THE TROPISM THEORY. [Proceedings Nat. Acad. Science, January, 1923.]

In all the experiments on circus movements with limuli the conditions were such that the animals were subjected to diffuse and non-directive illumination, the only conditions under which circus movements should ever be investigated. This was accomplished by arranging several mazda lamps around the outside of a cylindrical glass dish lined on the inside with tissue paper. Three intensities of light were obtained by placing the lamps at different distances from the center of the dish, viz., 150, 300, and 450 mm., and although the intensities were not accurately determined, they were always in the same proportion, and were approximately 8,000, 2,000, and 900 candle meters. The conditions of asymmetry in the photoreceptors were produced either by removing or by blackening the two median eyes and one lateral eye, leaving the other lateral eye functional. One hundred thirty-five experiments on thirty-eight animals furnished the data presented here. The paths of the animals were transferred to record sheets, and were afterward measured as to length and number of degrees turned per centimeter. It was found that the number of degrees turned per centimeter varies directly with the light intensity, being 6.7 for 8,000 cm., 5.23 for 2,000 cm., and 4.78 for 900 cm. In other words, the circles turned are larger under low intensity than they are under high intensity. To state the differences in more concrete form, it may be said that the diameters of the three circles turned are in the proportion of 100 to 128 to 142 for the corresponding intensities of 8,000, 2,000, and 900 candle meters. This result is in accord with the Weber-Fechner law.

The experimental animals were selected because of the regularity of their phototropic reactions. It was found that about 25 per cent of normal freshly collected animals are very irregular in their reactions, some being indifferent to light, some being at first definitely positive and soon thereafter negative, and still others showing a mixture of positive and negative reactions. A higher percentage of irregularity is found in animals which have been in the laboratory several days. In spite of this irregularity in the phototropic reactions of *limulus*, which may be due to several factors, such as the ease with which some individuals are frightened by handling, the state of nutrition, and unknown factors due to previous stimuli, yet it is clear that the animals taken as a whole are fundamentally positive to light, and that positive circus movements appear as a result of a symmetric stimulation. Many factors were found which modified or obliterated this fundamental phototropic reaction. Such behavior illustrates very well the fact that a primitive reaction of an animal may be profoundly modified by other reactions occurring simultaneously.

This is not at all a new idea, since it has long been known that there is an inclined place of animal behavior, beginning with the lowest forms whose reactions to stimuli, such as light, are machine-like in character, and ending with man, whose reactions to the same stimuli are almost always modified or suppressed by reason, learning, etc. It is not surprising, therefore, to find that *limulus*, the anatomy of whose nervous system has led to the belief that the animal corresponds closely to the hypothetical ancestors of the vertebrates, shows a modified tropistic reaction many times in respect to light.

The inverse relation between the light intensity and the diameter of the circle turned as a result of asymmetric stimulation contributes further evidence to Loeb's theory of heliotropism formulated in 1888. It should be pointed out that although several investigators previous to that time had proposed theories of orientation somewhat like the tropism theory of Loeb, none of them embraced all the facts, and none of them were founded upon such conclusive evidence as Loeb's. It is absurd to claim that such early workers as Ray and de Candolle had the same idea as is expressed in the tropism theory concerning the photochemical effect of light upon the eye, since the true science of photochemistry was not even begun until about the middle of the nineteenth century.

When circus movements are performed by an animal in diffuse non-directive light, the strength of the photic stimulus remains practically constant throughout a single revolution, since the rays of light enter the eye at all angles with the same intensity. This fact would vitiate any hypothesis based upon localized retinal stimulation to explain circus movements in animals with eyes. The phototropism of animals without eyes cannot of course be explained by such a hypothesis, but is subject to explanation by the tropism theory. The evidence from *limulus* as well as from other forms is preponderantly in favor of Loeb's theory, and

the few real exceptions so far reported are undoubtedly due to the masking of phototropism by other more complex reactions occurring simultaneously. [Author's abstract.]

Keith, A. MAN'S POSTURE: ITS EVOLUTIONS AND DISORDERS. [Br. Med. Jl., March 24, 1923, I, 493-542.]

This is one of a series of fascinating addresses on the evolution of the erect posture in man. In this section bearing on the subject of scoliosis, he says: "In none of the orthograde forms is such a continuous and urgent demand made on the postural spinal mechanism as in man. In man only is the whole weight of the suprasacral part of the body supported erect on the spine over long intervals. The demand on this neuromuscular postural mechanism is even greater in the sitting than in the standing posture, particularly if a person sits leaning forward in writing and reading. Sitting bolt upright is particularly exhausting, more especially for young people in whom growth of vertebrae and of spinal muscles is proceeding apace. The muscles which act on the short levers of the spine yield first, while the muscles which act on the long costal levers can still keep on. These exhausted short spinal muscles are rested by allowing the vertebrae to rotate until the articular processes begin to lock and the transverse processes rest on the necks of the long costal levers. Herein lies the beginning of lateral curvature or scoliosis. If the habit becomes fixed, then come the deformities of chest, vertebrae, and spine with which orthopedic surgeons are only too familiar. It is not correct, however, to say that spines are not perfectly adapted to the upright posture; it would be more accurate to say that human spines were not evolved to withstand the monotonous and trying postures entailed by modern education and by many modern industries."

Kraus, F. VEGETATIVE SYSTEM AND INDIVIDUALITY. [Med. Gesellschaft, Berlin, 8, XI, 1922; Med. Klin., November 26, 1922, 18-48.]

Kraus approaches his subject from the point of view that all organic development is the result of a convergence of internal and external determining conditions. There is not only the chemico-physical union of the germ cells but also the medium in which the development takes place. The proper use of stimulus over against the over-great power of stimulus is in general made possible through the establishment of an equilibrium every minute between the internal forces of the organism (relatively) enclosed within itself and the forces of the medium. According to the degree of complication (grade of differentiation) of the species and the individual analyzing receptors, *e.g.*, the sense apparatus, create precise and variable, adapting and habitual relationships between ever lesser elements of the external world and the finest functions of the reaction cells with their distinct manifestations. But under the special conditions of an actual situation there may occur a reaction according to the type of an intelligent relationship. This may reveal itself and be comprehended

through an abstract ideal factor like a curve through its quadrant. Everything centers upon the question whether the life impulse is a creative one, and if the vital capacity for direction may be so conceived as if something new in life and experience came into being. Thus the problem becomes the defining of the constituents of our organization in which are to be sought the deepest roots of that immanent capacity for control which we call life. A series of cations is important for the normal course of development, *i.e.*, Na, K, Mg, on one side; Ca, on the other, as well as a slight excess of the OH- over the H-ions. Proof of this lies in the general differences in development in the lower animals in which these relations between the ions are disturbed. The same is true for the preservation of developed forms of certain sea animals as medusa and others. Such correlations can be found further, especially in K and Ca. Potassium has a diastolic, calcium a systolic effect upon the heart, so that they counterbalance one another. The activity of the vegetative portion of the impulse is seen already at the beginning of individualization. Here is the greatly diffused residue of the protoplasm which during ontogenesis is not organically specific, is undifferentiated. The border structures (membranes) of this protoplasmic structure are members of the vegetative system belonging to the colloid electrolyte, the sodium electrolyte, a combination of antagonistically acting cations buffer, hormones, definite endogenous and exogenous stimulating substances (attraction) and toxins as well as a mechanism of catalyzers. In the exclusively regulatory sense all this is controlled by the vegetative nerves. The motor phenomena in this vegetative portion of activity are performed by surface border potentials. Further, this relative condition of the K group of ions as regards the ions of the Ca group is decisive for function. The H- and OH-ions stand in direct dependence upon the K- and Ca-ions. In these reactions colloidal electrolytic acidosis alternates with alkalosis. A portion is kept always in current through electrolytic circulation. The electrolyte affects all the characteristics of condition and efficiency of the organism. To prevent the organism from falling into a definitely stable condition, which means incapacity for function, the body through the membrane-electrolyte system is kept in a certain state above this equilibrium. Sharper distinction must be made between metabolism (fermentation and oxidation) and distribution of substance. Disturbances of transportation are much more frequent than those of metabolism. The regulation of the entire metabolism in the broadest sense of the word lies under the control of the vegetative nervous system. Therefore all those constitutional diseases which usually are handled independently as metabolic disturbances are included in this chapter. The diseases of the endocrinous organs also belong here for the hormones which may be designated as lubricants of the vegetative nerve constitute a member of the vegetative system.

The vegetative nerves which regulate the vegetative division of func-

tion have close relations with the electrolyte. The sympathetic, *e.g.*, acts like Ca, calcium and adrenalin act as substitutes for the sympathetic. Adrenalin can effect nothing without calcium. But it will not do to identify the vegetative nerve simply with K and Ca or merely to accept the fact that it decomposes only K and Ca or that these two charge the nerve. The vegetative portion of activity and nerve act upon the H- and OH-ions of the colloid electrolytes. The physiological products represent a system of condensers, respectively oscillation circles comparable to a spool, connected one behind another with a condensor. They are therefore conductors provided with self-induction of localized capacity and ohmic resistance. One must think of a dielectricum between the condensing plates which undergoes structural changes under the influence of the sodium electrolyte, under nerve influence. The capacity for oscillation of the vegetative system in the widest sense, that is the fact that the arrangement of the material itself experiences periodic divergence with time appears in auto-oscillations to which also forced oscillations are added. Oscillations arise of themselves. One finds in the organism very slow movements of oscillation and also adaptation to the rapid electrical oscillations. The electrical charge of the vegetative system manifesting itself in the constant current and its oscillations may serve as the measure of the excitement in the organism. The vegetative system is automatically active; reception takes place without interruption but is only secondary. The introduction of a steady current of a completely uniform whole is very difficult while oscillations which should follow simultaneously are relatively easy to bring about. The adaptation necessary for this is known as inhibition. The vegetative system is the unrest of the organism. The marker of time is the release of the psychic condition through both antagonistic cation groups. Through coupling of the condensers there arises a system with two grades of freedom. Most systems with two grades of freedom possess two chief oscillations which furnish, generally speaking, all possible conditions of oscillation of the system combined with one another in various strengths and phases. Comparison of these mechanical relationships with the electrical explains that which happens at both levels of the vegetative cerebral centers. The regulation effected in the higher of these centers takes place according to the principle of striking upon a definite mirror.

The vegetative system carries on a distributive existence in the isolated organs and a collective one in the personality. In the latter one often meets with vagus or sympathetic syndromes incomplete and distributed throughout the body. An essential process of control may be stated by saying that when the clockwork of the vegetative system runs down it winds itself up. The vegetative nervous system is not established once for all during ontogenesis through specific organic energy and singleness of purpose in the control. All simultaneous excitement stands in competition for the substance for the moment available in the vegetative

nervous system. The activity at the given moment is neutral. Its change, the involvement of other amounts of available energy varies in every case. It is necessary for the establishment of temporary connections that the new agent should meet the effect of another agent already active. If such a new stimulus in the brain strikes upon another center which is in a condition of strong excitement reception wins its way to this center and from this to the end organ. Where no such center is present such a stimulus is dispersed without effect. In this way may be discovered the cerebral laws of association. In each case the choice of a reflex in a given moment is not dependent upon the intensity of the stimulus but upon the quantitative factor of the focal-like excitement. Here one must seek also the roots of the gross neuroses.

The analyzers come into consideration as a second factor. These break up the stimulus constellation into individual parts. Among others is the intestine; its decomposition of albumin is one of the vagus processes. The latter reach their peak in the anaphylactic shock and its equivalents, *e.g.*, fever. The biology of immunity belongs also therefore in the territory of the vegetative system. The sense organs are special analyzers. All vegetative centers can act by themselves or in numbers. The vegetative system is the connecting link between the personality and the organs. It is to be emphasized that the nature of the individual is in no way fixed simply upon the sum total of the species pattern. The series of vital processes which take place does not consist in the sum of the parts, but the most important chains of life processes each time draw the remaining parts after themselves and to themselves. There are originally psychophysical neutral constituents of the organism which come into consideration as the nuclei for the building of the individual. Life cannot, like the organism, be separated into a whole and its parts. It appears as a unified process the nature of which is that it is present in distinguishable moments. But the personality as the controlling agent of this life is a graded one, so that it may be considered as a double personality, a deep personality, and a vertical one. The deep personality is held together through the striatum and its relations to the extrapyramidal and vegetative systems. The chief part of the impulses from the skin, the joints, and the ligaments go to the corpus striatum. The capacity for spontaneous action is created with the appearance of the cortical motor paths, but the nucleus of the personality is the deep individuality. That which we understand as individual type above all is bound directly or indirectly to the deep personality. On it depends the intensity of the stimulation. The vegetative system intermediates between the personality and the individual systems of organs. One is in no way justified in localizing psychic processes in the brain. The recently discovered thirst center may be valued only as the water regulating center of the vegetative system. Deviations of the individual reaction type are clinically demonstrable. Further, the psychophysical indivisibility is to be

looked upon as the real structure of the unified life. Subsequent reflection first separated body and soul as working independently. The psychic constitution is no new factor nor may the emphasis upon it be justified. It is a part of the entire individual character. If one considers the vegetative system as the connecting bond between organ system and personality then the prognosis for those suffering from heart diseases will no longer be made dependent upon the hypertrophy of one portion of the heart but upon the manner in which the circulation has established itself in relation to the imbalance in the vegetative system. This is an extremely important diagnostic matter. The constitutional character is to be seen in the individual forms of control of the personality. The constitution must become an integrating part of the clinical condition and embrace it completely. [Jelliffe.]

I. VEGETATIVE NEUROLOGY.

1. VEGETATIVE NERVOUS SYSTEM.

Gamna, C. ON TUMORS OF THE SYMPATHETIC NERVOUS SYSTEM.
[Arch. per le sc. med., 1922, XLV, 99.]

Ferrero, V. MALIGNANT NEUROBLASTOMA OF THE SMALL INTESTINE.
[Arch. per le sc. med., 1922, XLV, 114.]

Berner, J. H. A CASE OF MALIGNANT GANGLIONEUROMA. [Beitr. z. path. Anat. u. z. allg. Path., 1922, LXX, 203.]

After some general considerations on the tumors of the sympathetic nervous system, Gamna describes a case of ganglioneuroma of the left suprarenal gland. The small tumor consisted of "atypical sympathetic nerve cells" with only a few nonmyelinated nerve fibers. The tumor cells were not provided with the connective tissue capsule proper to ordinary sympathetic ganglion cells. Ferrero describes a similar tumor of the small intestine and its secondary nodules in the liver. It is worth noting that both Gamna and Ferrero have based their histopathological diagnosis on the polymorphism of the cells forming the tumors investigated and on the fact that most of these cells were provided with short blunt processes, but neither of them has been able to show the existence in the tumor cells either of neurofibrils or of Nissl's substance, or of true long processes. The case investigated by Berner was like that of Gamna, but the tumor had completely destroyed the left suprarenal gland. In addition, seven smaller and apparently metastatic nodules were found in the lymph glands next to the left kidney. The tumor consisted of cells similar to embryonic sympathetic ganglion cells and of bundles of nonmedullated nerve fibers, some of which were accompanied by elements of the Schwann cell type. Many of the tumor cells were multinucleated. [C. da Fano, Med. Sc.]

Hale and Grabfield. DEPRESSANT DRUGS ON THE SENSORY THRESHOLD FOR FARADIC STIMULATION IN HUMAN SUBJECTS AND THE EFFECT OF TOBACCO-SMOKING ON THIS ACTION. [Jl. Pharm. and Exper. Ther., 1923, XXI, 77.]

The Martin method was here used for determining the effect of the diethylbarbituric acid hypnotics, of antipyrine and of acetphenetidin upon the sensory threshold for faradic stimulation. Parallel observations were made when the subjects were smoking and when they were not. In non-smoking experiments, the barbital produced a slight transitory decrease in irritability; antipyrine showed its maximum effect at the end of half an hour, when it had decreased irritability by 30 per cent; acetphenetidin was somewhat more depressant, but its greatest effect was not shown till about ninety minutes after its ingestion. In all three cases, smoking tended to nullify the effects of these drugs, bringing the threshold observations within normal limits.

Högler, F. ERYTHREMA: POLYCYTHEMIA. [Wien. Arch. f. innere Med., April 5, 1922, IV, No. 1. J. A. M. A.]

Högler remarks that research on the 150 cases of polycythemia on record has failed to explain the etiology, but great progress has been realized in treatment with radiant energy. Five cases are described which confirmed the efficacy of the radium rays applied to the spleen and bone-producing apparatus. The blood returned nearly or quite to normal, and the purpura-like changes in skin and mucosæ vanished, but the urticaria disappeared only in the irradiated areas. The radium acts on the constant hyperplasia of the blood-producing apparatus, and there are no geneal disturbances afterward such as often follow roentgen treatment. He exposed the bones, the thorax, the extremities and the spleen, when it was enlarged, using many fields 4 cm. square, and a highly active radium element. The polycythemia was of several years' standing, up to thirty, and the course of radium treatment took one or two weeks. Notwithstanding this extensive treatment, there was no appreciable general disturbance. The benefit persisted for a year or two, and then symptoms returned, but they yielded anew to another course of radium exposures.

Ström, S. PSORIATIC ARTHROPATHY. [Acta Radiologica, I, No. 1.]

The predominating change is bony destruction, often extending beyond the joints so as to leave small fragments only of some of the phalanges, while the other phalanges show atrophy. The hypertrophic changes described by French observers were insignificant. The skiagraphic appearances are said to resemble those in Raynaud's syndrome, sclerodermia, syringomyelia, and nerve leprosy, and therefore support the view that psoriasis has a nervous origin. Dr. Ström does not find any evidence in favor of Brock's hypothesis, based on improvement after the administration of stimulating doses of X-rays to the

thymus, that disordered internal secretion is responsible for psoriasis. Though very rare, the arthritic lesions in patients with psoriasis have attracted a considerable amount of interest, largely from their bearing on the nervous hypothesis of this common skin eruption. They are usually multiple, chronic, without any liability to cardiac complications, uninfluenced by salicylates, prone to attack the hands and wrists and to cause ankylosis, and have generally been regarded as belonging to the group of nervous arthropathies.

Haas, L. HYPERSENSITIVENESS OF SKIN TO ROENTGEN RAYS. [*Deutsche med. Woch.*, Aug. 25, 1922, XLVIII, No. 34.]

The intricacies of the light reaction capacity of the human organism are slowly being understood. The present author is inclined to see the hypersensitiveness of the skin to roentgen rays as an endocrine reaction. He is not acquainted with the vegetative nervous system of the skin. The possibility of hypersensitiveness to irradiation should always be taken into account in therapeutic practice, to prevent unpleasant effects from arising. Hypersensitiveness may concern one layer of the skin in one individual, and in another patient another layer, or two or more layers may be affected.

Stern, F. PSYCHOGENIC DERMATOSES. [*Zschr. f. d. ges. Neur. u. Psych.*, LXXIX.]

Stern mentions certain dermatoses which can be psychogenic, hyperidrosis, herpes zoster, angioparalysis, dermatographism, urticaria, pemphigus, alopecia senilis and prematura. Only those tissues can be psychogenetically affected which are direct receptors of the stimuli carried by the vegetative system. (Since all of the skin cells are in contact with the vegetative network this means that symbol stimulus reactions are possible in any of the skin structures.)

Williams, C. B. ASTHMA, HAY FEVER, NASAL HYDRORRHEA AND ANGIONEUROTIC EDEMA. [*Laryngoscope*, Jan., 1923, XXXIII, 31.]

A careful study and comparison of recent reports from a number of men particularly interested in the study of asthma, hay fever, nasal hydrorrhea and angioneurotic edema reveals a tendency to connect all these vasomotor disturbances, giving to them a possible common etiology. The author sees no reason why certain cases of eczema, urticaria, migraine, sympathetic disturbances of the nasal ganglion and some gastrointestinal crises heretofore considered of obscure origin might not be included with them.

Summarizing he says: "Evidence as to the etiology of those vasomotor disturbances known as bronchial asthma, hay fever, nasal hydrorrhea and angioneurotic edema seems to be leading to the following conclusions:

- (1) That they are symptoms only.
- (2) That they are of anaphylactic origin.
- (3) That protein sensitization is responsible for the precipitation of attacks in a large percentage of cases, if not in fact the cause in many.
- (4) That disharmony of the ductless glands possibly plays an important rôle.

(5) That exposure to cold sometimes leads to a hemoclastic shock which in turn may precipitate an attack of spasmodic coryza or others of these vasomotor disturbances.

(6) That foci of infection, particularly about the head, should always be searched for when seeking to find the cause for these disturbances."

A plea is made for a more careful study of these cases by the average practitioner in the hope that a better understanding as to the etiology of these distressing disturbances may be arrived at and to the end that permanent relief may be given to many of these sufferers who have been passed up as incurable. A bibliography is appended. [Author's Abstract.]

Schürer. ICTERIC DERMOGRAPHIA. [Deut. med. Woch., May 5, 1922.]

In this clinical contribution the author describes a type of dermatographia related to an early stage of jaundice. The patient was a man of fifty-three, who for the previous fortnight had suffered almost daily from short attacks of violent abdominal pain. After scratching an eczematous patch on his right forearm he noticed that bright yellow stripes remained. Similar stripes were evoked elsewhere simply by scratching. On examination the skin was found to be pale and without a trace of jaundice except where sharply defined, not raised, bright yellow $\frac{1}{2}$ cm. wide stripes were seen on both arms, the skin of which was quite intact. The patient had only one eye, and the sclera of this was jaundiced. The urine contained urobilin and was dark yellow, but with no albumin or sugar. There was a circumscribed area of tenderness and resistance in the region of the gall bladder. This was evidently a case of gall stones with commencing jaundice. Without mechanical dilatations of the capillaries of the skin by scratching, the concentration of bile pigment in the tissues was not high enough to allow of general discoloration of the skin. Experimenting in this case, the author found that scratching the skin with a fingernail left an intensely red, raised stripe with pale margins. After two to three minutes the red color disappeared, giving place to a raised canary-colored stripe. In five to ten minutes the skin was no longer raised, but the yellow color persisted; letters written on the skin with a fingernail were easily legible from one end of a large room to another. In this connection the author refers to an observation by Strasburger, who noticed that when Weil's disease was associated with urticaria the urticarial area was more jaundiced than the normal skin. In the subjects of dermatographia the

author's test should prove a useful and rapid method for demonstrating jaundice which has not become severe enough to discolor the skin. The explanation of this phenomenon is the following: the capillaries of the skin being dilated by scratching, blood plasma, containing bile pigments, escapes into the skin, from which it returns to the general circulation, leaving the bile pigments behind.

Armstrong, W. E. M. CASE OF GAIINT URTICARIA TREATED BY AUTOGENOUS STREPTOCOCCUS VACCINE. [Lancet, I, No. 5151, p. 994.]

This case report is of an urticaria of ten years' duration which was thought first to have appeared after eating mushrooms. Every four or five days a red rash appeared, rapidly reached a maximum degree of intensity and extent, and usually subsided almost completely within forty-eight hours of the first onset. The rash was accompanied by a temperature which often rose as high as 102.5 F., and by a considerable amount of headache and general malaise. The eruption followed no definite plan of distribution, but developed on any part of the face, body, or limbs. A light blow or the exertion of pressure on any part of the patient's body produced an urticarial swelling of greater or less degree according to the amount of violence exerted. The patient suffered from rheumatism and from sore throat. The history suggested that an organism of streptococcal type might be the cause of the trouble. A catheter specimen of urine was obtained when the patient was in the middle of an attack. From this a small badly staining short streptococcus was isolated. This was grown with some difficulty on trypsin-agar and a vaccine prepared. Its use was followed by a complete cure.

Marcus, A. SO-CALLED NERVOUS DERMATOSES. [Münch. med. Woch., Oct. 27, 1922, LXIX, No. 43.]

The author records a few cases of dermatoses which had been termed neurotic and which were more carefully analyzed and cured. One case of universal eczema recurring with each menstruation was traced to the artificial leather support used for the napkin. Another was due to the habitual addition of a little of a certain antiseptic to the bath water. Other cases were due to the use of a perfume, different toilet creams, etc. He gives a list of nineteen other toilet articles that have induced skin affections. In one case a man's periodic itching and crop of furuncles were traced to the contact with Japanese primroses in his garden.

Nicolas, J. and Gaté, J. DIFFUSE SCLERODERMA AFTER VACCINATION. [Bull. Méd., Oct. 21, 1922, XXXVI, No. 43. J. A. M. A.]

Nicolas and Gaté report a case of diffuse sclerodema in a man of forty-four without morbid antecedents. It developed in an acute form three weeks after the course of antityphoid vaccination. No similar case was found in the literature for the last twenty years. It seems, in this

case, that the vaccination must be incriminated for the affection, three weeks after the last injection. Two years before, an A and B anti-paratyphoid vaccination had entailed disturbances, which tends to show the peculiar susceptibility of the patient. On the other hand, it is now generally admitted that typhoid fever can usually be found in the remote or recent antecedents of certain patients with scleroderma. They query whether the thyphoid antiserum acted like a typhoid fever in this case, or if it constituted, on the contrary, merely a disturbing intoxication in a predisposed subject. One single case, however, does not allow any conclusive answer to these questions.

Bénard, R. and Coulaud, E. SCLERODERMA AND PITUITARY. [Bull. d. 1. Soc. Méd. des Hôp., Nov. 17, 1922, XLVI, No. 32.]

These cases gave no response to thyroid, but were favorably influenced by pituitary extract. Later the patient died, and changes in the pituitary, adrenals and thyroid were found.

Laignel-Lavastine and Coulaud, E. SCLERODERMIC SYNDROME WITH GOITER. [Bull. d. 1. Soc. Méd. des Hôp., Nov. 17, 1922, XLVI, No. 32.]

Scleroderma with goiter and tuberculosis and with atrophy of phalanges is here recorded. The cutaneous tuberculin reaction was negative, but turned positive when repeated after stopping the administration of thyroid and giving powdered ovary for ten days.

Nordmann, E. TROPHONEUROTIC ULCER OF THE FOOT BY REMOVAL OF SENSORY NERVE OF THE SKIN. [D. m. W., 1921, No. 21.]

Nordmann reports an injury of the sciatic in 1914 in gunshot wound of the thigh. Suture of the sciatic in 1916 without result. Since 1917 a trophoneurotic ulcer on the heel with sensory disturbance of almost the entire foot. Skin of the foot very dry. Operative removal of the nervus saphenus—which arises from the plexus lumbalis—in the region of the ulcer. After one month of hospital treatment marked diminution in size of the ulcer, good granulation. After two more months ulcer healed, capacity for work returned, skin of the heel fresh in appearance. Sensibility of the heel still diminished.

Bolten, G. C. A CASE OF SCLERODERMA. [Nederlandsch Tijdschr. voor Geneeskunde, Dec. 23, 1922, LXVI, p. 2986.]

Bolten has shown a case of scleroderma to the South Holland Neurologists' Society. A woman, thirty-six, from a neuropathic family, free from lues and tuberculosis, began to have severe paresthesiæ in hands and feet, $3\frac{1}{2}$ years ago, with deadness of fingers and a cold feeling in her limbs: the disease progressed quickly. There is very little movement in fingers which are in flexor contracture: there is very great sclerodactylia: the muscles of hands and forearms are very atrophic.

The mucous membranes of tongue and cheeks is thin, the lingual papillæ very small, tongue smooth, and there are large and small pigmented spots in the mucous membranes, and in the skin of neck and chest. Blood pressure low, and the hemoglobin content is diminished. Bolten defends the hypothesis that in scleroderma there is an adrenal deficiency. In some cases signs of Addison's disease have been present, and in others there has been doubt as to which of these two diseases was present. Other cases have occurred with Basedow's disease, and yet others in cases of syringomyelia. It is possible to regard the syndrome as an anatomical process in the great vasomotor centers (floor of the fourth ventricle), the sequel of chromaffin insufficiency, for in those cell-groups are situated the secretory centers for the adrenals. [Leonard J. Kidd, London, England.]

Babonneix, L. PROGRESSIVE LIPODYSTROPHY. [Bull. d. l. Soc. Méd. d. Hôp., Jan. 12, 1923, XLVII, No. 1. J. A. M. A.]

Babonneix demonstrated a case in a girl of seventeen who had lost most of the subcutaneous fat above the waist, while fat had accumulated in the lower portions of the body. Deposits of fat on the posterior aspect of the arms, general asthenia, and some minor signs made the condition atypical.

Levaditi, C. and Nicolau, S. NEUROTROPIC ECTODERMOSSES. [Ann. de l'Inst. Pasteur, Jan., 1923. J. A. M. A.]

Levaditi and Nicolau have succeeded in cultivating vaccine virus serially in rabbits' brains, like rabies virus. With this neurovaccine, as they call it, they have apparently demonstrated that only the tissues derived from the ectoderm are susceptible to infection from the filtrable, invisible viruses. Bacteria, spirilla, fungi and protozoa induce infection only in the tissues derived from the mesoderm. Each of these two groups of infectious agents is thus restricted in its action to one of the embryonal layers. The agents of the mesodermoses induce immunity by means of phagocytosis and a bactericidal and antitoxic action. The agents of the ectodermoses induce immunity by producing a local refractory condition. Probably the two embryonal layers have a different physicochemical composition; very few microorganisms seem to have an affinity for both. The spirochete of syphilis is one of the few exceptions. The very existence of vertebrates depends on the fact that the pathogenic microorganisms which swarm on the skin, intestines and nasopharynx are virulent only for the mesoderm and not for the ectoderm. Among the ectodermoses, they call attention to the neurotropic subgroup comprising vaccinia, herpes, encephalitis, rabies and poliomyelitis. The invisible viruses of this subgroup have many characteristics in common, especially the intense affinity for the central nervous system and a less pronounced affinity for the external segment of the ectoderm, the skin, cornea and nasopharyngeal mucosa. The virus does

not attack any cells unless they are of the ectoderm (or endoderm) and in a condition of regenerative proliferation or karyokinetic rejuvenation from some irritation. The research reported sustains the assumption that the virus of vaccinia, herpes and encephalitis spreads rapidly by the blood or peripheral nerves to all the tissues for which it has an affinity. After recovery each receptive tissue is left refractory to further infection of the same kind. General immunity is thus an accumulation of as many partial immunities as there were susceptible tissues to begin with. The refractory state gradually wears off. This occurs the more rapidly, the more rapid the regeneration of the tissue involved. The article is profusely illustrated.

Riggs, C. E. COINCIDENCE OF SHINGLES AND CHICKENPOX. [Minn. Med., Nov., 1922, V, No. 11.]

Riggs cites the case of a woman who developed herpes zoster of the left side of the face, affecting chiefly the second and third branch of the fifth nerve. There were a few scattered spots in the ophthalmic area, a few vesicles were observed in the external ear (the drum escaping), the mucous membrane of the mouth supplied by the superior maxillary and the inferior maxillary branches, also the left half of the tongue was covered with the herpetic eruption, which caused great suffering; the teeth were exquisitely painful and after recovery several cavities were found which were not present before the illness. Over the area of the left chin the vesicles were practically confluent and, where the skin approached the mucous membrane of the lip, formed a scab. There were no complications and recovery was uneventful aside from an aggravating paresthesia over the affected area, which still persists. About two weeks after the inception of this illness, a grandchild developed a typical case of chickenpox. The interesting fact is that there was no chickenpox around and she had not been anywhere where she could possibly have contracted it. After the usual incubation period, her brother, in turn, developed the disease. [J. A. M. A.]

Wiborg, A. THE ETIOLOGY OF ERYTHEMA NODOSUM. [Norsk. Mag. f. Laeg., Feb., 1923, p. 135.]

A. Wiborg observed an epidemic of erythema nodosum and has come to the conclusion that the disease is of rheumatic rather than tuberculous origin. Between November, 1921, and August, 1922, he saw as many as 30 definite cases, 18 of which occurred in December. In each of the other months there occurred only 4 cases or fewer. The epidemic was practically confined to a district where only 816 persons lived; here 26 of the 30 cases occurred. The age of 26 of the patients was between eight and fifteen—most of them were girls; the remaining 4 patients were women between the ages of sixteen and twenty-five. Only in two homes were there as many as two cases in each, yet in many families where a single case occurred there were several children. Most of the

patients suffered from protracted anemia after the illness, and 3 developed fatal tuberculous meningitis. The 8 cases of pleurisy occurring in conjunction with the erythema terminated in recovery. In the same period there were 19 other cases of pleurisy, all with effusion, and 14 cases of acute rheumatism. There were also numerous cases of muscular rheumatism. In support of his view that erythema nodosum is a rheumatic disease, the author remarks that in many of his cases the erythema nodosum was associated with erythema multiforme and pains in the joints; most of the cases reacted promptly to salicyl. Another point in favor of his view was the great frequency with which many cases of undoubted rheumatic disease occurred in the same period, and it is conceivable that the very wet Norwegian summer of 1921, with almost incessant rain from May till Christmas, favored the development of rheumatic diseases.

Wile, V. J., Wright, C. S., and Smith, N. R. EXPERIMENTAL ASPECTS OF IODID AND BROMID EXANTHEMS. [Arch. of Derm. and Syph., Nov., 1922, VI, No. 5. J. A. M. A.]

Certain definite things appear to have been established by the studies made by Wile, Wright, and Smith. Iodid and bromid exist in the body fluids following their ingestion, but are not found in the purulent material from acneiform lesions. Percutaneous sensitization tests for iodid and bromid are uniformly negative, and cannot, therefore, be used to indicate ingestion susceptibility. The ready substitution in the body fluids of chlorid by bromid leads to the hypothesis that the ultimate cause of this reaction in the skin differs somewhat from that caused by iodid. The percutaneous introduction of foreign protein in the presence of a circulating blood containing bromid resulted, in one case, in lesions simulating those caused by bromids spontaneously. Precipitins in the blood serum were not demonstrable, at least by addition in vitro of solutions of bromid and iodid salts in minute quantities to the blood serums. The local phenomena of iododerma and bromoderma do not find their explanation on simple bacterial nor simple chemical grounds. The ultimate explanation probably lies in a complex biochemical reaction. The classification of such cutaneous phenomena, however, as true sensitization or allergy is as yet unjustifiable in the light of present knowledge.

Szondi, L. and Haas, L. PRURITUS WITH ENDOCRINE DERANGEMENT. [Münch. med. Woch., 1922, LXIX, p. 584. J. A. M. A.]

Szondi and Haas state that of ten patients suffering from essential pruritus which did not respond to the usual dermatologic treatment they found in six cases typical pluri-glandular insufficiency, and in the remaining four patients there was dysfunction of at least two endocrine glands. The changes of the genital glands, which other writers mention in connection with pruritus, are only partial manifestations of the

pluriglandular insufficiency. In their cases the pruritus was merely a manifestation of endocrine dysfunction plus hypersensitivity of the peripheral sensory nerves. The latter was caused by pathologic metabolism products entering the blood stream on account of the dysfunction of the endocrine glands. The hypersensitivity exists latent in the whole region of the peripheral sensory nervous system and will manifest itself in the form of itching where there is constant or frequent irritation. An endogenous and an exogenous factor are thus necessary. The endogenous factor consists of a definite constitutional or acquired abnormality of the endocrine system. The most frequent exogenous factors are: fluor, nodes, onanism, rubbing of the collar, etc. The exogenous factor does not bring about the chronic itching except as the above-mentioned constitutional or acquired basis is present. Causal treatment has not so far been able to effect permanent improvement. In stubborn cases roentgen irradiation is recommended as symptomatic treatment.

Elliott, W. M. HERPES AND VARICELLA. [Glasgow Med. Jl., 1922, XCVII, p. 274.]

The occurrence of these two phenomena is reported by the author in nine cases of herpes in whom chickenpox followed in five, all within the incubation period of the disease. In two of the nine cases the diagnosis of impetigo was possible.

II. SENSORI-MOTOR NEUROLOGY.

8. NEUROSYPHILIS.

Königstein and Spiegel. CEREBROSPINAL FLUID IN EARLY SYPHILIS. [Wien. klin. Woch., June 16, 1921.]

Cerebrospinal fluid in the early stages of syphilis, even when there are no clinical nervous symptoms, shows changes similar to those found in cerebrospinal syphilis and paresis. As hitherto no systematic comparative investigations have been made correlating the changes in the cerebrospinal fluid with those in the central nervous system, the writers examined 31 cases, consisting of 4 of acquired syphilis in adults, 26 of congenital syphilis in infants, and 1 fetus, with the following results: When the cerebrospinal fluid was positive, changes were found in the central nervous system, especially the meninges; the spinal cord was always affected to a greater or less extent. When the cerebrospinal fluid was negative, the spinal cord was always normal, though in one case meningeal infiltrations were found over the cerebellum, and in another case over the cerebral hemispheres. In children the Wassermann reaction was more frequently positive than in adults when lymphocytosis was scanty or absent.

Eberson. DISSEMINATION OF SPIROCHETA PALLIDA IN EXPERIMENTAL SYPHILIS. [Arch. of Derm. & Syph., February, 1921; B. M. J.]

Spirochetes have been isolated from the blood stream of experimentally infected rabbits seven, ten, and thirty days after intratesticular inoculation, at times corresponding to twenty-six, twenty-three, and three days prior to the appearance of any initial lesion. The regional lymphatic glands have been found by Brown and Pearce to contain spirochetes as early as forty-eight hours after infection, and early invasion of the blood stream was demonstrated by experimental infection with blood obtained from rabbits one week after scrotal inoculation. Thus he establishes the fact that syphilitic infection is not to be regarded as limited to the portal of entry. He deduces from the early finding of spirochetes in the lymphatic glands that the intermediary stage of the spirochetes does not exist. The spirochetes can be found in the regional glands before they can be found at the seat of inoculation, but the failure to find them at the seat of entry does not in any way prove a life-cycle for the spirochete.

Merklen, P., Devaux, A., and Desmoulière. A. ASTHENIA OF SYPHILITIC ORIGIN. [Presse Méd., February 16, 1921; J. A. M. A.]

Evidence is presented to show that asthenia in many cases is the result of a polyglandular endocrine derangement of syphilitic origin. The syphilis may be acquired or inherited, the disease ignored or supposed to have been cured, or the asthenia may be the only manifestation of inherited syphilis. The patients—generally women—complain of continual or intermittent weariness. They are not sick enough to be kept at home, but they have to make an effort for everything, and are constantly complaining, and are generally regarded as lazy, or that their troubles are imaginary. With asthenia in a woman, the husband should be examined for syphilis, and in children, the parents. The Wassermann reaction may be positive when extremely sensitive technics are used. But the convincing argument is the way in which the asthenia is thrown off and the whole aspect of life changed for the patient under specific treatment in the majority of cases when kept up long enough. Adjuvants are good but not indispensable; organotherapy is incapable of modifying the syphilitic lesion of the ductless glands. In the experiences of the writers suggestion was excluded. The asthenia may yield to specific treatment before the Wassermann reaction is modified.

Bouman, L. THE DISTRIBUTION OF SPIROCHETES IN JUVENILE PARESIS. [Nederl. Tijdschr. voor Geneeskunde, April 16, 1921, LXV, p. 2208.]

While much time and trouble are often needed to demonstrate spirochetes in the brain of a case of dementia paralytica, yet in some cases the so-called "bee-swarms" are found in foci, and in others we have the vascular type in which the spirochetes occur in dense intramural masses and as perivascular coverings. In Bouman's case immense numbers were found in the cerebral cortex by Jahnel's method. The relationship of the

spirochetes to the particular nerve cells was studied by Getzowa's hemateïne-eosine stain; they showed a preference for the third and sixth layers of the cerebral cortex, especially the sixth; this latter layer contained in the glia-preparations masses of glia cells with protoplasmic processes. Some spirochetes were found in the medullary substance of the cerebellum, but not of the cerebrum; the pia was free, but once a few were seen at the border of cortex and pia. The relation of the spirochetes to the vessels varied greatly; sometimes they were uniformly distributed over the vessel wall or its surroundings; at others the vessels appeared as if they acted like a magnet on the spirochetes; sometimes they formed a wall round the vessel and were absent in the vessel wall; the perivascular infiltration went *pari passu* with the quantity of spirochetes round the vessel. By Getzowa's staining method the ganglion cells are seen to be surrounded by spirochetes, which, however, do not penetrate inside the cells; this holds good for the cells of Purkinje and for those of the cerebral cortex. [Leonard J. Kidd, London, England.]

Guillain, G., Jacquet, P., and Lechelle, P. SYPHILIS SIMULATING EPIDEMIC ENCEPHALITIS. [Bulletins de la Soc. Med. des Hôp., January 28, 1921.]

The differential diagnosis between syphilis and encephalitis epidemica is sometimes confusing, as this clinical study shows. One woman of forty had been having neuralgic pains in the right side of the head and face, with ptosis of the ocular muscles, for nearly three weeks. She was apparently healthy otherwise, with four healthy children, but Wassermann tests were positive, and under specific treatment improvement was realized. In a second case described the neuralgic pains, ptosis, etc., on one side of the head, with erratic pains in neck and arm, and mental and physical weakness were accepted as signs of epidemic encephalitis, but the lumbar puncture fluid gave a positive Wassermann reaction.

Nonne. MENINGITIS IN SYPHILIS. [Med. Klin., December 11, 1921, XVII, No. 50; J. A. M. A.]

The prognosis of acute syphilitic meningitis is good if it is recognized and specific treatment started in time. Only four cases are known with necropsy, and Nonne here adds another to the list, with spirochetes found in the cerebrospinal fluid. The meninges of the entire central nervous system showed leptomeningitis. The symptoms were those of meningitis in general. The Wassermann reaction was negative in the spinal fluid in some of these cases, but the mastic test was always positive in the cases in which it was applied. The workingman of forty-eight had been given a vigorous mercury and arsphenamin course of treatment during the second and third month after infection. In the fourth month he had complained of headache. The other symptoms of acute meningitis developed six months after infection and proved fatal in ten days. Nonne is convinced that acute syphilitic meningitis is more common now than it used

to be, and he incriminates arsphenamin for this. The case teaches that syphilis should always be thought of in cases of acute meningitis; the benefit from specific treatment may be the only clue to the differential diagnosis. Nonne asks why in his case and in Fahr's similar case no improvement could be detected under specific treatment although the lesions were comparatively mild.

Sidler-Huguenin. OFFSPRING OF PERSONS WITH INHERITED SYPHILIS. [Schweiz. med. Woch., January 20, 1921, LI, No. 3.]

In this clinical laboratory study 250 persons of known syphilitic infections are studied as to their progeny. Fifty families are studied, 28 per cent of which were childless. Among the 250 persons with inherited syphilis only nine lived to be sixty. The male sexual organ seems to be injured more than the female by inherited syphilis, judging from the lesser number of children in the families in which the father was the parent that had inherited syphilis. No characteristic symptoms of inherited syphilis were found in the sixty-five children of the second generation. He concludes that individuals with inherited syphilis can be reassured that their children will be sound, although childlessness is more frequent.

Lloyd, James Hendrie. SYPHILIS OF THE EIGHTH NERVE. [Arch. of Neur. & Psych., May, 1921.]

The writer refers to the fact that comparatively little notice had been taken of this affection by American and English neurologists until recently, and that it is to the otologists that we must look for more complete work, because the subject is generally assigned to them. His attention had been called anew to the subject by the recent occurrence of early and striking cases in hospital practice. This may have been due in part to the intensive study of syphilis of the nervous system which has followed on our knowledge of the spirochete and our advanced laboratory methods. There are certain characteristics of syphilis of the eighth nerve which the neurologist should bear in mind. Its onset may occur early in the secondary stage. Suddenness of onset and rapidity of course are sometimes striking. The patient may become deaf in a few days. The disease is usually bilateral and other cranial nerves, especially the seventh, may be involved along with the eighth. This fact of a cranial polyneuritis is evidence that the affection is primarily a basilar meningitis, not a labyrinthitis, as some of the older otologists taught. The two divisions of the auditory nerve may not be equally involved, the cochlear in one case, the vestibular in another, being the more affected. The vestibular nerve should always be tested by the Bárány methods. Finally, the disease may be incurable and cause complete deafness in a very short time. That there may be a true syphilitic labyrinthitis, especially in congenital syphilis, is not to be denied; but it is not easily distinguished from syphilis of the nerve trunk, and in the early acute cases here considered there is probably always a meningitis. Lloyd reports a series of

cases which occurred in his service in the Philadelphia General Hospital. Three of these patients were observed from the period of the primary sore, and the involvement of the eighth nerves occurred in the early secondary stage. One of the patients died of an acute pneumonia, and a histological study showed characteristic changes in the eighth nerves, especially lymphocyte infiltration. There was also a dropping out of axis cylinders as seen on cross section, possibly suggestive of the action of a toxin or a poison. Lloyd discusses the question of neurorecidivus or the changes in neurosyphilis caused by a provocative dose of arsphenamin. All the patients had had this treatment. Another thing to be considered is the possible injurious action of the drug itself directly on the nerves. This charge has been made against this arsenical preparation not only in the case of the eighth nerves but also in the case of the optic nerves. Two of the patients had abolition of the Achilles reflex, but only on one side. Attention has recently been called to this abolition of the Achilles reflex as a possible sign of arsenical neuritis after the use of arsphenamin. [Author's abstract.]

Tezner. CEREBROSPINAL FLUID IN CONGENITAL SYPHILIS. [Mon. f. Kind., October, 1921, XXII, No. 1; J. A. M. A.]

Tezner reports his findings in 43 children. There were absolutely positive findings in 41.8 per cent; positive Wassermann reaction in 32.5 per cent, and lymphocytosis plus positive Wassermann in 13.9 per cent. In the 16 infants among these children there were absolutely positive findings in 62.5 per cent; positive Wassermann reaction in 50 per cent; positive Nonne-Apelt reaction and lymphocytosis each in 31.3 per cent; a pronounced syphilitic exanthem in all except one infant, which presented lymphocytosis and a positive Wassermann reaction in the spinal fluid. Of the 27 older children, 20 showed no nervous symptoms, but there were absolutely positive findings in 15 per cent; positive Nonne-Apelt in 5 per cent, and lymphocytosis in 5 per cent. In 7 of the older children who presented nervous manifestations there was a positive Wassermann reaction in the spinal fluid in 70.1 per cent and lymphocytosis in 20 per cent. The Pandy reaction (when taken) was parallel to the Nonne-Apelt reaction. No parallelism between the other reactions could be established. The positive Wassermann reaction was more common than in adults; the reaction in the spinal fluid was often the only change discoverable. While the spinal fluid is involved in a comparatively large percentage of infants, the changes retrogress rapidly and are not associated with any permanent injuries to the central nervous system.

Urechia and Rusdea. NEUROSYPHILIS SIMULATING DEMENTIA PRAECOX. [Encéphale, December, 1921, XVI, No. 10.]

These authors emphasize a well known clinical observation that the symptoms of dementia precox may be observed in the course of neurosyphilis. These schizoid symptoms may be transient or chronic. In one

case the clinical picture was that of dementia precox through six years. Cases are known up to twenty years' duration, and lumbar puncture or necropsy first cleared up the diagnosis. In some of the cases both the Wassermann reaction and the spinal fluid findings became negative during a stationary phase. Catatonia, as has been shown, is the result of injury of a certain part of the brain, the morbid agent may be quite diverse, as the numerous catatonic syndromes seen in epidemic encephalitis have emphasized.

Tumpeer, I. H. SYPHILIS IN THE THIRD GENERATION. [Am. JI. of Syphilis, Vol. V, October, 1921.]

The requirements for transmission of syphilis to the third generation are: (1) Acquired syphilis in a grandparent; (2) certainty of parentage of the affected parent; (3) hereditary syphilis in that parent; (4) absence of acquired syphilis in both parents; (5) certainty of the parentage of the child; (6) hereditary syphilis in the child; (7) absence of acquired syphilis in the child.

The difficulty of demonstrating actually such conditions in a given case has led many thinkers to refuse to acknowledge that third generation transmission may occur. The dystrophies seem to be the characteristic features of this inheritance. Older writers were deprived of the information concerning syphilis resulting from the present day advances of laboratory investigation. Syphilitic lesions may be produced in laboratory animals by blood, semen, and inguinal gland material from individuals whose infection dates back as many as thirteen years, and whose Wassermann tests at the time of obtaining the material were negative. This gives an experimental basis for the phenomenon of late transmission and shows that the disease may be latent for much longer periods than the earlier observers thought. From this type of research it is to be hoped that experimental demonstration of third generation transmission may be furnished.

The cases described are the children of a woman with hereditary syphilis. This is proved by her four plus Wassermann test and the radial fissures of her lips and corners of the mouth, which are pathognomonic of inherited infection. Her first husband is not known. The eldest child, the only child by the first husband, has the typical Hutchinson teeth, strabismus, epileptiform seizures, and is mentally retarded. At the time of examination her blood and spinal fluid tests were a doubtful negative, although she had four plus reactions at two earlier periods. The father of the other four children has a negative test, and is physically normal. He has lived with the mother for eleven years. Of his children the eldest has primary optic atrophy and a large quadrilateral head, which has been described by other observers in third generation transmission. He, too, is mentally retarded and has a chronic nasal discharge. A fractured femur was slow in healing. His blood and spinal fluid react four plus. The three younger children have negative tests, but the two

girls have nasal discharges and the boy has the quadrilateral head and is stunted in height like his older brother. Against the possible argument that the mother may have acquired syphilis from her first husband or an intervening factor are the behavior and moral attitude of the mother and the absence of miscarriages, stillbirths, or the early manifestations of inherited syphilis in any of her children. It is to be remarked that the eldest child manifested epileptiform seizures, catatonia, and mental disturbances and the next child developed optic atrophy following severe trauma which caused coma in both cases. [Author's abstract.]

Strümpell. CHANGES IN DISEASES. [Med. Klin., November 27, 1921, XVII, No. 48. J. A. M. A.]

After living elsewhere for twenty-five years, Strümpell resumed in 1910 his charge of the medical clinic at Leipzig, and he here compares his impressions of diseases now with his earlier experiences. Chlorosis, chronic gastric catarrh, and emphysema have almost disappeared from the record of the clinic, thanks to greater precision in diagnosis, but tabes is just as frequently encountered as ever. He knows of whole series of cases of tabes that were given intensive treatment from the very first infection with syphilis. The classic picture of tabes is less common than the cases with atypical features, and possibly the intensive treatment may be responsible for this. The diagnosis of tabes was always comparatively easy and certain. He declares that the arsphenamin question is by no means definitely settled. His experience has demonstrated, he says, that arsphenamin frequently acts as an agent provocateur for syphilitic injury of the nervous system. Impartial comparison of neurosyphilis before and since the introduction of arsphenamin demonstrates beyond question that the so-called neurorecurrence forms of early syphilitic disease of the nervous system and meninges are quite frequent now while they were, at most, entirely exceptional before. His impression is that this is a frequently encountered unfavorable modification of the course of syphilis for which only the direct influence of this commonly used drug can be responsible.

Thom, B. P. TERTIARY SYPHILITIC PSYCHOSES OTHER THAN PARESIS. [Am. Jl. Insanity, 1921, LXXVIII, 503.]

Thom states and quotes authorities therefor that syphilis is an important factor in practically all other psychoses besides paresis. The subject has not been studied intensively and further investigation will undoubtedly bring to light considerably more data as to the rôle syphilis plays in psychoses of all kinds. He is also of the opinion that the somatic signs and serological and cytological tests are the criteria to be applied in mental disorders in which syphilis is suspected as the cause rather than the mental phenomena. Symptoms suggestive of syphilis as the causative factor in any given psychosis are headache, motor disturbances, involvement of the cranial nerves, disorders of sleep, alterations of character

sensory phenomena—anesthesia, paresthesia, disorders of the sense of heat and cold. While admitting the clinical difficulty of diagnosing between cerebral syphilis and paresis he is of the opinion that they represent two distinct entities. He is not in accord with the views of Strümpell or Gaines that paresis may be due to toxins generated by the *Treponema pallida*. Thom does not consider these psychic syndromes as parasymphilitic; in fact, he ignores this term and insists that if a psychosis is syphilitic it is so because of the presence of the *Treponema pallida*, and therefore is as frankly syphilitic as a cutaneous gumma. If seen early his opinion is that many of these patients can be cured or at least the progress of the disease can be arrested. It is because so many of these patients are seen after irreparable damage has been done that the prognosis is so often hopeless. However, he is in accord with Collins that even when clinically and serologically cured the mental scars remain and these patients are never the same as they were before. Intensive treatment with salvarsan, mercury and potassium iodide offers these patients their only chance of recovery. [Author's abstract.]

Bambarén. SYPHILIS AS A FACTOR IN EPILEPSY. [Siglo Médico, May, 1921, LXVIII, No. 3519. J. A. M. A.]

Bambarén draws the balance sheet of the conception of syphilis, inherited or acquired, as a factor in epilepsy, citing testimony for and against it, including a number of articles in *The Journal*, and Levy Bing's thirteen cases of essential syphilis with an unmistakable history of syphilis in all, and remarkable improvement under treatment for syphilis. He remarks in conclusion, "How difficult it is for new ideas to gain a foothold," as his comment on Strümpell's denial that inherited syphilis has ever been conclusively demonstrated as a factor in essential epilepsy.

Schiphorst, F. B. M. B. ETIOLOGY AND SYMPTOMATOLOGY OF TABES. [Psychiatrische en Neurologische Bladen, 1921, Nos. 1 and 2, p. 1.]

Schiphorst has critically examined the histories of 418 cases of tabes admitted over a period of thirty years. In 63 per cent there was definite evidence of luetic infection; but on various grounds he concludes that tabes is a genuine syphilitic affection. The latent period between the date of luetic infection and the appearance of the first tabetic signs averaged fourteen years; it was not shortened by either abuse of tobacco or by gonorrheal infection; also treatment applied directly after the luetic infection did not lengthen it. But the latent period became shorter the later in life syphilis was acquired. Further, the factor of trauma was not found to influence the development of tabes, and it was only relatively seldom that evidence of hereditary predisposition was present. Edinger's "aufbrauchstheorie" was not supported. On various grounds it was shown that in tabes spirochetes possessing strong neurotropic properties are active. The most frequent sign in tabes was the loss of the ankle-jerk (86 per cent); then in order came loss of K.J. (76 per cent), A.R.

pupils (75 per cent), ataxia in legs (72 per cent), Rombergism (69 per cent), shooting pains in limbs (60 per cent), vesical symptoms (59 per cent), paresthesiæ (50 per cent), hypotheseæ (47 per cent), ptosis (39 per cent), etc. Analgesia was as low as 17 per cent, delayed sensory conduction only 12 per cent, and crises only 8 per cent. In only 2.6 per cent of the cases were any vascular changes found; this is attributed by Schiphorst to the very feeble action of the spirochetes active in tabes in influencing the blood-vascular system. He concludes that the question of the existence of a particular syphilitic virus in which the neurotropic properties predominate has not been removed from the program of scientific research, but on the contrary is more than ever worthy of attention. [LEONARD J. KIDD, London, England.]

III. SYMBOLIC NEUROLOGY

1. NEUROSES AND PSYCHONEUROSES; PSYCHOANALYSIS.

Brown, W. L. ENDOCRINES AND PSYCHONEUROSES. [B. M. D., 1923.]

At a meeting of the West Kent Medico-Chirurgical Society held on March 9th at the Miller General Hospital, Greenwich, Dr. W. Langdon Brown gave a lecture on the influence of the endocrines in the psychoneuroses. He said that response to chemical stimuli was the most primitive form of defense in animals, and this was shown in the queen bee; at a certain stage of development she was strongly heliotropic, but the immediate effect of fertilization was to destroy this heliotropism and she sought the shelter of the hive. Internal secretions regulated instinctive behavior. So it was with human beings—the instinctive behavior of a young man in the presence of the opposite sex depended mainly on the state of his endocrine system. The activities of the endocrine glands were correlated to a large extent through the nervous system. The sympathetic system coöperated with the adrenals, thyroid, and pituitary, the parasympathetic mainly with the glands of the digestive organs and their annexes. The influences leading to hyperthyroidism might be classified under the headings of nutritional, toxic, and psychic; lack of vitamins led to diminished thyroid secretions; tonsillar sepsis and intestinal sepsis were apt to produce thyroid enlargement; and in Graves' disease the psychic factor played a large part. In the war, officers with more responsibility developed neuroses, while privates more commonly developed hysterical paralyses and mutism. Excitement and emotion caused glycosuria, especially in Jews. Fear was a perversion of the defensive mechanism of the body. The adrenals were fighting glands and made aggressive persons. In pituitary disturbance walking and talking developed late; the fat boy in *Pickwick*, in his sleepiness and his desire to make people's flesh creep, was an example of pituitary

disturbance. The thyroid gland was the creator—child-bearers and artists never had myxedema. Graves' disease increased after the air raids in London and after the San Francisco earthquake. Hypothyroidism tended to produce a resigned melancholy. In a case of acute mania which developed in a man suffering from myxedema the mania passed off when thyroid treatment was resumed. If the gonads developed early there was an example of a precocious child.

Lancaster, Walter B. THREE CASES OF ASTHENOPIA TREATED BY PSYCHOTHERAPY. [Trans. Am. Acad. of Oph. & Oto-Lar., 1922, p. 191.]

In each there was a basis of genuine refractive error. Symptoms had resulted from the refractive error. Properly selected glasses did not give complete relief. The symptoms which remained were by no means serious in themselves. The patients attached tremendous importance to relatively trivial symptoms, not for the reason that the suffering was great, but because the patient feared they were a warning of disaster to come if not heeded. There was no hysteria, no subconscious effort to escape from an intolerable situation by inability to use the eyes. There was fear that serious incapacity was threatened, or close at hand.

Case 1: Unmarried woman, forty-three, complains that she cannot read even a minute or two. She works eight hours a day designing and making fancy lamp shades. Her refractive errors have been corrected by competent ophthalmologists, and further examination brought to light no new defect.

O.D. $-0.75 \simeq +1.75$ Axis 55 V = 6/8

O.S. $-0.75 \simeq +1.50$ Axis 130 V = 6/8

less than $\frac{1}{2}\Delta$ heterophoria at distance, and $3\frac{1}{2}\Delta$ exophoria at the near. Accommodation 4.50 D. each eye; convergence good; fundi and media normal. After examining her with sufficient care and thoroughness to convince her that I was basing my opinion on adequate knowledge of her case, I assured her positively and emphatically that she had no disease of the eyes that would make her blind or lead to inability to use her eyes. I told her that she need not give up her work, and would soon be able to read. In order to convince her more fully, I pointed out the fact that if she had a serious defect which made it impossible to use her eyes a couple of minutes for reading, she could not possibly work on her lamp shades many hours a day. She was told that certain symptoms of discomfort which she felt when she began to read and which she thought were signals which must be instantly heeded, were really nothing serious, and that it was her apprehension which incapacitated her.

She was directed to read three minutes a day, and increase one minute daily, paying no attention to the discomfort she would be likely to feel at first. Her progress has been entirely satisfactory.

Case 2: Professor, sixty-three years old. Cannot read more than fifteen to twenty minutes. Careful correction of his refractive errors and the use of astringents had failed to relieve him. Close questioning as to what made him stop reading showed that he felt a sensation of dryness and scratchiness, and feared that if he disregarded these symptoms he would surely bring on serious eye disease, because these were the warning signs of eye-strain. It was his belief that if he had proper glasses, these symptoms would disappear.

No opinion was expressed until after a fairly thorough examination which revealed no defects other than those found by his previous oculists. It was possible, therefore, to assure him with great positiveness that there was nothing serious the matter, that the symptoms which he felt when he used his eyes were very common and could safely be ignored in his case. A slight increase in the power of one cylinder was accepted; and in order to aid the mental effect, one lens was changed—important when the patient comes with a strong preconceived idea that a change in glasses is needed. A soothing collyrium was ordered. Subsequent progress favorable.

Case 3: Cannot read or use eyes after dark because right eye closes (blepharospasm). Here again careful search brought out no new defects. The significant feature was the ability to use the eyes during the day. Advice as to lighting arrangements and the use of a soothing collyrium brought no relief. It came out that after reading a short time in the evening, he would feel a smarting or irritation of the conjunctiva, and then the eye would shut. Having once fallen into the habit of responding to the slight conjunctival irritation by a contraction of the orbicularis, the habit easily perpetuated itself and became chronic. There was a possibility that by combining confident assurance that he would recover, with the use of a dilute local anesthetic in the eye to remove the sensation which seemed to be the initial factor in the vicious process, the habit could be broken up. This treatment proved successful, but required some weeks.

Successful treatment of this type of fear or anxiety-state depends first on accurate diagnosis: you must be sure that you have not overlooked or neglected the treatment of any possible factor; second, you must convince the patient that you know what you are talking about, and you must secure his confidence and coöperation. The aid of consultants may be needed. Try to get a clear conception of just what has gone wrong, and why. Then you must use your ingenuity, with much patience and sympathy, to break up the morbid process. Do not make the mistake of telling the patient, or implying, that there is nothing the matter. Asthenopia or blepharospasm from fear are just as real as asthenopia or blepharospasm from uncorrected hypermetropia and astigmatism. It is worth pointing out that it is much easier to handle successfully such a case, if, as in all three of these, it has been under

the care of some other practitioner, who has carefully studied the patient and assures you that he has corrected all defects to the best of his ability, and does not see why the patient should not be able to use his eyes. You make a thorough examination and confirm his findings. You can then talk to the patient with more positiveness and evidence of your own conviction, than you might feel safe in showing if you were seeing the patient for the first time, and did not have other expert opinion behind you. If you make a guarded prognosis, and show caution and a disposition to hedge, the patient inevitably senses *your* fear and seizes upon it as a confirmation of his own—and the case is worse. [Author's abstract.]

Kugler, E. ETIOLOGICAL THERAPY OF THE NEUROSES. [Jhb. f. Psych. u. Neur., Vol. XL, Nos. 2, 3.]

The author presents from his clinical observations a "system of the neuroses" in which he seeks to establish a law between etiology and symptoms. He describes the method by which he deduces his system. He states that in many cases there is a way from the organic disease to the neurosis as well as from the neurosis to the organic disease.

Fischer, S. CRITICISM OF THE MORE RECENT THEORIES CONCERNING THE DISTINCTION BETWEEN SENSATION AND IDEA. [Zschr. f. d. ges. Neurol., Vol. LXIV.]

Fischer objects to the inadequacy of the usual distinction between sensation and idea. It does not cover borderline situations, such as waking dreams, dream formations, pseudohallucinations and hallucinations. In sensation a portion of the environment is perceived with the object which need not be the case with the idea. Yet in the idea it is necessary, as it is not in sensation and perception, to explain and complete the perception by actual knowledge in order to recognize the object and establish its outer connection. Sensations are passively received, compelled, although subject to attention while ideas proceed with a feeling of activity. They depend on will though they are not entirely voluntary. Sensations may be defined as phenomena with which there exists a dispositional knowledge that they are caused by external stimulus, ideas those phenomena with which there is knowledge that they are not so caused, though this criterion is not absolute. This distinction is the product of experience but where even control through sensations in other sensory areas and the possibility of orderly connection with the environment fail the distinction between sensation and idea is lost. This may happen in cases of dissociation or of narrowed affectivity. Hallucinations may appear as perceptions simultaneously in different sensory areas and yet one be convinced of the reality of the stimulus. Even without this extension of the hallucinations those that exist do not seem to contradict the rest of the external association. This is largely due to

weakness of the power of judgment. When they appear as sensation they are accepted in order as from superhuman or subhuman powers or the appearance is so vivid that there is no doubt of its objectivity.

Lehrman, Philip R. A STUDY OF PARANOID TRENDS IN HYSTERIA. [N. Y. State Jour. of Med., June, 1922.]

The author points out that usually when a paranoid trend appears in a hysterical patient consideration is given first to the paranoid trend, and rightly so, for there are many cases of early paranoiacs who for a long time show so-called physical symptoms of a psychoneurosis. Yet cases which are unmistakably hysteria with a definite persecutory trend are occasionally seen. He would not attempt to revert to the older view of hysteria which included many states that now are recognized as belonging to other psychotic types. But when in hysteria symptoms belonging to such a well-defined mental picture as paranoia, with its poor therapeutic possibilities, are seen it is quite essential to detect this combination if it occurs. Two cases are cited in which paranoid trends developed during psychoanalytic treatment. In the first case of conversion-hysteria the paranoid trend could not be removed completely though its mechanisms were brought out clearly in the light of analysis, and the patient made a social recovery. In the second case of anxiety-hysteria complete recovery was brought about by psychoanalysis. Dr. Lehrman states that the occurrence of psychotic symptoms in the psychoneuroses and the more frequent occurrence of neurotic symptoms in all forms of insanity has forced the conception of the nosological uniformity of all functional psychoses and neuroses. The common factor in the causation of both of these conditions is the relative damming of the libido as described by Freud which disposes itself in ambivalency and infantile fixations in both. In the author's cases he would theoretically invoke the concept of a double disposition for the repressed libido in the same person. This concept should not strike one as an unnecessary formulation, though it may be argued that where narcissistic fixation occurs (as in paranoia) object-libido is primarily avoided and there is no need for an hysterical illness to develop. On the other hand, when hysteria manifests itself it is certain that the stage of object-libido has been reached. The neurosis merely represents the realization of that form of sexual activity which corresponds to fixation at the level of object-love, after the wish for such sexual activity had undergone the mechanisms characteristic of the unconscious. This objection can be met by Freud's statement that fixation occurs to some degree at all stages. It is moreover conceded that there is a mutual reciprocity between the amount of libido which remains attached to the self and the amount finding external expression. In the course of a person's life libido frequently oscillates between internal and external expression according to the opportunity for external expression and other various factors. This freedom of movement of the libido in both directions is requisite for mental health. In patients

primarily affected with paraphrenia there is marked adhesiveness of the libido to the self. In patients secondarily affected with a narcissistic neurosis, such as the paranoid trends in hysteria which the author reports, there is a necessary recognition of a freedom of movement of the libido toward a further regressive level if the primary defense is interfered with. This secondary regression is not as malignant as a primary one. Here, as in the normal, there is an interchange in the stages—the regression is only temporary and a return may be accomplished. The circumstances favoring this secondary regression, resulting in paranoid symptoms in a previously diagnosed hysteric, is a threatened solution to the neurosis such as may result from analysis. It is in this situation when the libido is about to be detached from the phantasy of object-love, that a further regression may take place especially when the incentive for recovery is impoverished by external circumstances. [Author's abstract.]

Comby, J. DISORDERS OF DENTITION. [Journ. de Méd. et de Chir. Prat., July 10, 1922.]

J. Comby deprecates the popular belief that the eruption of the teeth can give rise to or aggravate a series of morbid conditions to which infancy is liable. He quotes with approval the aphorism uttered forty years ago by H. Roger, one of the leaders of pediatrics in France—"the disorders of dentition do not exist." The author gives a number of historical instances of this widespread belief and supplements this with numerous examples occurring in his own practice during a period of forty years. Comby regrets that many experienced practitioners appear to take the line of least resistance and give way before the eloquence of an excited mother "who demands that the child's gums shall be lanced," whereas he is convinced that patient investigation of the case of any child suffering from fever catarrh, diarrhea, etc., so frequently attributed by relatives to dentition, would show the true origin of the disease. He quotes the case of a child seen in consultation last winter: "A child of one year, suffering for six days from influenzal bronchopneumonia with a temperature of about 40° C. Other cases were in the house, and the mother, convalescent but still coughing, begged the medical man to lance the child's gums, although he had eight teeth and had no dental symptoms." The author passes in review cases of "teething cough" and "dental asthma," which have no better foundation than the preceding instances. He refers to acute dermatoses, attributed to dentition, and states that the greater part of these are "toxidermias"—"nevertheless the mother is obsessed by that idea of dentition which she believes to be supremely dangerous." In the same way, infantile neuroses—insomnia, enuresis, convulsions, and epilepsy—are often attributed to dentition. After giving numerous other examples of this widespread popular belief, the author concludes by reiterating Rogers' aphorism—"the disorders of dentition do not exist."

BOOK REVIEWS

Heymans, G. DIE GESETZE UND ELEMENTE DES WISSENSCHAFTLICHEN DENKENS. Vierte durchgesehene Auflage. [Johann Ambrosius Barth, Leipzig.]

The juggling and unraveling of theories of knowledge are favorite sports among the philosophers. Hard working doctors rarely have time or the curiosity to curl up in easy chairs and endeavor to follow the Ariadne threads of the historical developments of these intellectual games even when presented in the simplest possible forms.

Yet the present work deserves a special mention in this place, and a definite recommendation, since the author has been able to so combine the data of the various theories of intelligence in such a manner as to give them value to the philosopher as well as to make them intelligible to the nonphilosophical expert. In other words here is a valuable combination of popular presentation and philosophical integrity difficult of accomplishment in this extremely complex field.

The inquirer who is beguiled, however, into thinking this is a "snap course" will be much disappointed, for here are no short cuts to the mastery of the Mathematical Sciences, nor the Natural Sciences, but careful elaborations of the most recent work in these advanced fields.

The philosophically inclined physician will here find a reliable guide and a thorough textbook of logical thinking which will enrich the understanding obtainable by his daily contacts with the perplexities of disease processes.

Cole, R. H. MENTAL DISEASES. Third Edition. [University of London Press, Ltd., London.]

This new edition of Cole's textbook shows a decided growth over its predecessors. It has been entirely rewritten and reset and for a short treatise deals with the problems in as satisfactory a manner as could be wished for medical students.

Whereas we believe that the short-descriptive type of presentation here employed has many disadvantages in making students static in their attitudes towards disease processes, this drawback is not altogether easy to overcome in the average medical curriculum. The author has made an effort to overcome this pedagogic fault, but it still lingers too forcefully in the accent upon purely descriptive presentation with insufficient emphasis upon the meanings of things. Medical science is too set up with the "names of things," mostly Greek translations of outstanding features, and too neglectful of the

why's of processes. Nowhere is this more prevalent than in the study of the psychoses. The signs of change, however, are apparent everywhere and some of them have been incorporated in this short and useful text.

Kraus, Friedrich, u. Brugsch, Theodor. SPEZIELLE PATHOLOGIE UND THERAPIE INNERER KRANKHEITEN. In 10 Bänden. [Urban u. Schwarzenberg, Berlin, Wien.]

In this large new system the tenth volume is devoted to diseases of the nervous system. This volume is made up of three portions, each a volume in itself.

Eninger contributes the opening chapter on anatomical and physiological considerations. Then follow Peripheral Nerve Palsies, Neuralgias and Neuritides, Spinal Column Disorders, Muscular Atrophies, Brain Tumors, Topical Brain Diagnosis, Topical Spinal Cord Diagnosis, and Familial Diseases by Drs. Cohn, Alexander, Schuster, Peritz, E. Förster, Bing, Fischer and Schol, respectively. Section 2 deals with Meningeal Disease, Sinus Thrombosis and Encephalitis, by Schlesinger and Schuster; Multiple Sclerosis by Lewy, a very fascinating chapter; Brain Parasites, Syringomyelia, Pontine, Cerebellar and Oblongata Diseases, Amyotrophic Sclerosis, Neurosyphilis, Inflammations of the Nervous System, by Henneberg, Creutzfeldt, Klarfeld, Kramer, Förster, Wohlwill and E. Strauss, respectively.

Section 3 opens with a specially fine chapter on the Vegetative System by Dresel. Kutzinski writes on Hysteria and the Compulsive States, Stier on Neurasthenia. Alexander deals with the Occupation Neuroses, de Crinis with Epilepsy, Freund on Eclampsia, Cassirer on the Trophoneuroses, Lewy on Paralysis Agitans, and the various Extrapyrarnidal Syndromes, Schroeder on the Toxicoses.

These chapters are very excellent and this new system, so far as its neurology is concerned, deserves the highest praise.

Burkamp, Wilhelm. DIE KAUSALITÄT DES PSYCHISCHEN PROZESSES UND DER UNBEWUSSTEN AKTIONSREGULATIONEN. [Julius Springer, Berlin.]

Causality as a concept is noticeable by reason of the comparative silence about its principles in contemporaneous medicine. Descriptive pathology with its consequent "diagnosis" of "diseases," which when named create the illusion they are known, has been the reigning ideal, only within comparatively recent times being felt as unsatisfactory.

The break with a purely descriptive pathology came earlier in psychiatry than in any other field of medicine—in fact if one goes back into the time of the Greeks we find this selfsame struggle between static descriptive Socratic attitudes and the dynamic-interpretative flux of Heraclitus and Protagoras. So all through the centuries there have been those for whom structure-matter was all, and those for whom function-force was the important element. Mediators and wise men throughout the centuries have taught the inter-

dependence of the two and there are abundant signs that in the prevailing philosophies of the pragmatic type that such bipolar trends are reconcilable.

In psychology rigid laws of causality have been difficult of application chiefly because "Conscious" activities have been thought to be the object and subject matter of research, and for the most part such consciousness of aim or effort could not be resolved by introspection or other process into the biological categories of reflex activities.

The author has set himself to put order in the house of regulation of psychical processes. He very easily develops the idea of functional reflex arc systems and carries these up into a psychical hierarchy where the "Ego" reigns, although still subject to the reflexology "motif."

An interesting discussion of strict determinism for psychical activities, full of intriguing suggestions and thought provoking ideas.

Dürken, Bernard. ALLGEMEINE ABSTAMMUNGSLEHRE. [Gebrüder Borntraeger, Berlin.]

The many conflicting conceptions which fill the hundreds of books and pamphlets upon "heredity" are here referred to and in short, clear cut and satisfactory manner the author separates postulates from hypotheses and these again from those more valid working conceptions "theories."

In a comparatively small monograph he analyzes the general problems of heredity as seen in plant and animal life, at the same time presenting a thorough inquiry into the leading generalizations which as Darwinism and as Lamarckism have come down through the last half century or so. All this is done in that most enviable of methods, excellent popular exposition with sound scientific background.

Jones, Ernest. PAPERS ON PSYCHO-ANALYSIS. Third Edition. [William Wood and Company, New York.]

Among the earlier advocates of the new psychological developments in medicine Jones stands out as preëminent. His writings have been singularly clear and to the point and he has shown a remarkable facility for exposition as well as for original presentation.

The first edition of this present work evidenced this and the succeeding editions have emphasized it. Each edition has contained some new material and the present one is perhaps richer than any of the others in that five new chapters have been substituted for five older ones. Furthermore, the older chapters have been revised to bring them nearer to the newer findings which are being made. For psychoanalysis is a living, moving research and the libido theory, as a conceptual tool, is constantly enlarging the field of its discoveries. The practical issues of treating faulty human behavior and even organic disease are receiving more and more help from the psychoanalytic study of unconscious processes and a true dynamic pathology of far wider significance than was originally outlined is making itself evident through this newly opened avenue of investigation.

Jones' book is one of those fundamental treatises from which the student of psychoanalysis can go into fields of original investigation; for here is an excellent guide in which exposition and original findings are deftly interwoven.

We commend it heartily to our readers.

Wimmer, August. MEDDELSER FRA UNIVERSITETS PSYKIATRISKE LABORATORIUM. [M. P. Madsens Boghandel, Copenhagen.]

The American custom of gathering into a single volume reprints of the literary output of a laboratory or hospital is here followed by Professor Wimmer of Copenhagen for the work of the Psychiatric Klinik and the Nerve Department of the Community Hospital of Copenhagen.

There are fifteen papers representing a great variety of interests in neurology and psychiatry. Krabbe contributes a short paper on Paralysis Agitans and also discusses the Alcohol Problem of Denmark; Neel writes on Encephalitis Syndromes, Vedsmand on Myasthenia Gravis as an endocrinopathy, while Wimmer contributes some ten or more papers. Two or three deal with striatal pathology and are of more than incidental interest and value. Wimmer's discussion on Heredity in Mental Disease is also of much interest.

Brown, William. TALKS ON PSYCHOTHERAPY. [University of London Press, Ltd., London.]

These are three rather simple extemporaneous addresses on psychotherapy given at the Kings College, University of London. As the reviewer cannot envisage the audience no basis for judgment is laid. They are popular talks, nothing profound, almost naïve, and one could tear them apart for their easygoing lack of logic if not of faulty information, but it is not impossible that the audience was better served than if they had been more rigorous and better informed. One can see, however, very little reason for their publication.

Davis, Loyal Edward. NEUROLOGIC DIAGNOSIS. [W. B. Saunders Co., Philadelphia and London.]

There is a lot of material packed into this small book which is excellently chosen to illustrate the various syndromes presented by the author.

The subject matter of neurology, however, can no longer be encompassed within such few pages as offered by the author and it is a matter for discussion whether it should be attempted, even when so well done as in the present instance.

Richet, Charles. TRAITÉ DE MÉTAPSYCHIQUE. Deuxieme Edition. [Felix Alcan, Paris.]

A second edition of this work has been called for showing the popularity of its subject matter. This is to be expected. The itch for magic will never die, nor should it, for a fond interest in the

unknown—unknowable maybe—ceases only when one is intellectually or spiritually dead.

Whether the pathway chosen and here exhaustively outlined will lead to essential enlightenment the future alone will decide. The present program has little to commend it to the psychiatrist who, dealing with projections, illusions, hallucinations, and a vast variety of self-deceptions, has a better appreciation of "subjective" attitudes than those shown by the author or authors quoted. In some instances the historically informed reader is amused by the solemn truths urged upon the public by the author. In more understandable form they have been known to psychiatry for centuries. There is nothing new nor mysterious about them.

Nonne, Max. *SYPHILIS UND NERVENSYSTEM.* [Fünfte Auflage, S. Karger.]

This collection of lectures appears in a revised edition, with many additional notes and some radical rewriting of older concepts. The new material is present throughout the entire book and thus it may be said to be truly a new edition.

For twenty-two years this work has held its own because of its intrinsic merits. It still remains the most complete and authoritative work in its field.

Herbert, S. *THE UNCONSCIOUS MIND. A PSYCHO-ANALYTICAL SURVEY.* [A. & C. Black, Ltd., London; The Macmillan Co., New York.]

The author's preface states the intent of this pleasing small volume. It is to present a general outline of the psychology of the unconscious as it has been developed by Freud and by the methods which he has elaborated.

It is evident from the outset that this is no literary desk effort but has come from experience. The author has tried out the principles. He has used the baits, and actually gone fishing into the depths of the unconscious and finds what his predecessors have found, a certain catch, now familiar to most who have done any actual analytic work.

He has described the procedures very simply and has given an exceptionally clear and readable rendering of the outlines of psychoanalysis.

Lenz, Fritz. *MENSCHLICHE AUSLESE UND RASSENHYGIENE.* Zweite Auflage. [J. F. Lehmann's Verlag, München. \$2.25.]

To show how selection operates to improve the race is the function of this presentation. It is the second volume of a series edited by Baur, Fischer and Lenz. The first volume, already reviewed in these pages, shows the vast number of hereditary factors present in human beings which not only separates them into different races but also lays the foundation of somatic and mental variations, many of which are deleterious to the individual and the race.

The present volume enters more fully into the study of the factors

of selection which may be utilized to save a nation or help to make it a productive force in civilization. Thus are presented biological and social selective factors and their interrelated workings. A second section deals with Practical Race Hygiene in the discussion of which the control of disease, the understanding of the meaning of marriage and its functions, the family, educational forces, the significance of politics and social government, economics, capitalism and socialism, these are the type of topics discussed.

They are very sensibly presented and were the ideas here recorded more widespread among the people, instead of being the conceptions regulating the impulses of the few, a better civilization would undoubtedly be forthcoming.

Tendeloo, N. Ph. KONSTELLATIONSPATHOLOGIE UND ERBLICHKEIT. [Julius Springer, Berlin.]

The Cellular Pathology of Virchow has served its purposes and is passing. In the march of progress it has been supplemented by more dynamic concepts, still too grudgingly applied in interpretative pathology. A constitutional or constellational pathology is in the making of which this small brochure is a partial program. It sketches hastily the relations of the growing conceptions regarding heredity and the bearing of these on a synthetic pathology. It is a stimulating essay.

Kronfeld, Arthur. PSYCHOTHERAPIE; CHARAKTERLEHRE; PSYCHO-ANALYSE; HYPNOSE; PSYCHAGOGIK. [Julius Springer, Berlin.]

To the complacent mid-Victorian mind who with Pope says "Whatever is—is right" the recent events of the World's War will be of little interest as evidence that the world is sick. He will little understand the thesis put forth by Stärcke in his ingenious study on "Psychiatrie und Psychoanalysis" that the so-called "Normal" people of the world sink to deeper levels of regression than the neurotics and even psychotics. In fact he says he has been looking for "normal" people and has never found them. The conception of "normal" is an illusion. When we read some recent essays on history by one of our modern historians—Barnes—that history as it has been taught is "bunk," and open our ears to a few—a very few—educators, that most of our pedagogy is "bunk"—we may sympathize with that gibe of one of our humorists who tells us that "teaching so many things that are not so" is what is wrong in our educational systems.

Quacks, charlatans and all kinds of false teachers are not the special privilege of the medical field—they evidently abound everywhere—and nowhere better illustrated than in some of Johnson's illuminating cartoons of the United States Senate. It is because of these pedagogic, political and other types of quacks and charlatans that the world is sick—and what are we going to do about it? Russia evidently believed it, but dumping the apple cart does not pick out the rotten apples from the good ones; it only spoils the whole lot and is not the remedy. A rational psychotherapy is needed

for sick society and above all the public must get out of their slovenly attitude that permits the medical quacks and charlatans to exist, for here is the beginning of the whole canker that fills the apple cart full of rotten apples.

Psychotherapy is the most important branch of all therapy—it is infinitely more important to protect the public by having honest science doctors practicing psychotherapy, than it is to insure good surgeons or good drug-giving doctors. The bad results of bad surgery or bad medical prescriptions are found out almost right away and this ilk are spurned by the community almost overnight—but the evil done by quack psychotherapists only comes out in the vast catastrophes to which attention has been called. The remedy is to demand the strictest control over psychotherapy and the highest type of trained medical men only permitted to practice it. Bad psychotherapy fills our jails and asylums, corrupts business and defeats the administration of justice and weaves a web of hypocrisy and corruption that strangles society and raises “bunk” to the throne in our intellectual, business and political life.

This is a long introduction to this modest monograph but it is such a sincere, simple and honest appeal for a rational psychotherapy that we feel it warranted. If the principles laid down by Kronfeld, with some reservations, could be more widely taught, if the medical psychologies of Kretschmer and Schilder and White could be put in the place of our “bunk” psychologies then the crooks, and quacks, and charlatans in all the various fields in which they hand out “hokum” to the populace would be shown up to be what they really are and we could pick out the rotten apples in our social political life. The hypocritical silver-tongued orators and inflated blatherskite demagogues would be out of a job and a real reconstruction of national health be put in the place of revolution and anarchy.

Freud, Sigmund. DER WAHN UND DIE TRÄUME IN W. JENSEN'S “GRADIVA.” III. Auflage. [Franz Deuticke, Leipzig und Wien.]

This delightful analysis of Jensen's novel is here reproduced in a third edition practically unaltered. The English reader is fortunate in having both a translation of the original *Gradiva* and Freud's analysis in one cover, but attention is here called to this new edition, for those who would possess the original of the analysis, and as an indication of the living interest among readers in this fascinating work.

Fabritius, H. ZUR KLINIK DER NICHTPARALYTISCHEN LUES-PSYCHOSEN. [S. Karger, Berlin.]

The nonparetic syphilitic psychoses offer many difficult problems both for diagnosis and treatment. Plaut, in 1913, broke the first definite furrows in this field and in the ten years that have intervened Fabritius would tell us that relatively little advance has been made in this difficult field. Indeed there have not been lacking those who would depart from Plaut's genial conception, and reduce the

material—so interpreted—to anomalous or atypical paresis, Wimmer, Boumann and others, or conversely, dealing with endogenous factors, speak of psychoses in syphilitics, in which the luetic infection plays little or no rôle.

The author, working in Bonhoeffer's clinic, has carefully analyzed twenty-three cases in which the syphilitic infection is brought into etiological relation with the psychosis but which developed syndromes other than paresis. He concludes from his study that when syphilis brings about a psychosis which is not paresis it may show itself in one of the following forms: (1) Exogenous Reaction Types—here he finds confusional states, amentia-like pictures, dream state psychoses, and Korsakow types. The course is acute or gradual, rarely stormy. The outcome is death, dementia or rarely complete cure. (2) Hallucinoses or hallucinatory paranoid types. These are acute or chronic, and may recover, lead to dementia and death. (3) Chronic Defect States: (a) syphilitic pseudoparesis, (b) post-syphilitic dementia, and (4) manic-depressive and catatonic forms and admixtures of the same.

Alexander, F. M. CONSTRUCTIVE CONSCIOUS CONTROL OF THE INDIVIDUAL. [E. P. Dutton & Company.]

It is very difficult to review this book. On the surface it seems so plausible, at least Professor Dewey would seem to so indicate in his idealistic introduction. Yet there is a flaw somewhere, which we feel that even Dewey has not seen in his devotion to the "method" as apart from the underlying mechanisms which should give a warrant to the procedures. Dewey calls them "new," but the Greeks were as proficient as Alexander in their application, although only psychoanalysis has been able to show the rationale of the whole situation. It is for this reason we seriously object to the "touting" of John Dewey, much as we respect his activities in many directions.

Alexander is undoubtedly clever. He is keener than one can really admire; it reminds us of the "tongue in the cheek" cleverness of many a similar but less acute intelligence who has to make his way in this world of opportunity, and the "devil take the hindmost."

As we have tried to make our way through his forest of words—words—words, we would give assent to the essential value of a simple idea trussed up with a multiplicity of circumlocutions that in the end has made us very weary.

Williams, E. H., and Hoag, E. B. OUR FEAR COMPLEXES. [The Bobbs-Merrill Company, Indianapolis.]

Another popular work on Mental Health. Not bad, and yet not so good. Part I contains a fair description of the common fears of mankind, a little helter-skelter, and many very frequently observed ones unmentioned. Part II contains a lot of misstatements about the function of dreams and as many misconceptions of what is meant by "wish-fulfilment" and by "sexual" as are usually met with in these popular expositions. And so on—slap dash to the end—a journalistic type of book full of contradictions in statement, opinions, and

logic—breezy like a convention nomination, with a lot of bunk and also much common sense. It is a great pity that one's literary itch should run away with one's logical faculties, but then strictly logical books are usually dry and uninteresting and this is neither. If read at all, a lot of salt should be handy, to correct the author's prejudices and contradictions. Thus Freud "overdoes" things. "His ideas are not new"—"Their *truth* has been known for years"—then, in the name of Heck, "if known for years," and "truth"—how "overdone"—this is only a type of the running around in a circle kind of writing that this book shares with lots of others. One expects this sort of thing with the W. J. Bryans of politics, but not in so-called science.

Hellpach, Willy. GEOPSYCHISCHE ERSCHEINUNGEN. Dritte Auflage. [Wilhelm Engelmann, Leipzig.]

We have had occasion to state that this is an extremely interesting and important book, for both of its previous editions. This, the third edition, by reason of careful revision, is even more valuable than its predecessors. Buckle in his classic called attention to the influence of the environment on the development of human culture and civilization. Hellpach has here given us a careful study of those facts which permitted Buckle's valuable study, and has extended them far beyond the thought of this genial production. The ideas and data here presented should be available for all in translation.

Edenharter, G. F. REPORT FROM THE DEPARTMENT OF PATHOLOGY, CENTRAL INDIANA HOSPITAL FOR THE INSANE. Vol. VIII. [Indianapolis.]

Attention is called to this work because more of this sort of thing should come from our state hospitals. It is a very valuable record and we congratulate the author on his accomplishment.

Miles, Walter R. EFFECTS OF ALCOHOL ON PSYCHO-PHYSIOLOGICAL FUNCTIONS. [Carnegie Institute, Washington.]

An interesting compilation of results on the effects of alcohol on isolated functional activity. Very valuable from one aspect; totally misleading if read out of the narrow frame of the experiments. A well worth while study.

Barnes, Francis S. AN INTRODUCTION TO THE STUDY OF MENTAL DISORDERS. Second Edition. [C. V. Mosby Company, St. Louis.]

The author has wisely combined two fragmentary presentations and here presents a useful volume. Useful in more than one way. First, there is a lot of ordinary horse sense in the book; again, the author evidently is not embarrassed with the many things that are not so—he does not give us a lot of useless, worn-out definitions, and finally he tells the student to look at his patients as human beings much like everybody else but not quite so fortunate in making an adjustment between individual aims and group restrictions.

And yet he is not quite so clear as these commendatory statements

might indicate, for in spite of himself the old habits of scholasticism come through and he deals with attention disorders, perception disorders, and similar dry psychological categories and leaves his previously stated ground work of dealing with a "feeling" organism.

Still, taken by and large, this is a book which will be of value to the student in that it will stimulate him to want to know more about human personality and its variations. It represents an effort to get away from a purely descriptive psychiatry and we wish it a deserved success.

Moon, R. O. HIPPOCRATES AND HIS SUCCESSORS IN RELATION TO THE PHILOSOPHY OF THEIR TIME. [Longmans, Green & Co., New York. \$2.00.]

This book contains the Fitzpatrick Lectures delivered at the Royal College of Surgeons, 1921-1922. They are a delightful reminder of what the cultivated English physician has so frequently contributed to medicine. Many an early Greek physician had time and inclination to cultivate philosophy; it is a stimulus to see that their good habit has not been entirely lost, especially since the difficulties of gaining general concepts in so richly cultivated a field have been so greatly increased.

Dr. Moon has sketched in very easy form much of the outstanding spirit of the times and for the most part has caught its meaning. We are not one with him in his interpretation of the Sophists, who really represented a dynamic idealism constantly at war with a static materialism, but his sketches of these early Greeks are lucid and interesting.

Goldschmidt, Richard. EINFÜHRUNG IN DIE VERERBUNGSWISSENSCHAFT. Vierte Auflage. [Wilhelm Engelmann, Leipzig. 18 G. marks.]

The science of genetics has in its recent development become of increasing importance and value to the student of neurology. In medical thought heredity has been too diffuse a concept. It has been used unthinkingly as a sort of hobgoblin to whose prankish activities much that has been unsolvable has been attributed. Neuropsychiatry has too long made use of this subterfuge, but thanks to a number of students both within and without the fold this phase of sloppy thinking has been passing and the newer and more exact concepts which have emerged from the Mendelian experiments are finding most practical application.

There have sprung up all over the intellectual world a number of excellent texts which have brought together the extremely numerous series of observations and experiments in this field, of which this of Goldschmidt is one of the most satisfactory. It now appears in a fourth edition of some 550 pages, well printed and richly illustrated.

It develops in a logical and progressive manner the gradual evolution of the Mendelian concepts and shows the various practical outcomes of this rapidly expanding series of generalizations.

It is one of the clearest and most carefully elaborated of the various textbooks and can be most cordially recommended to neuro-psychiaters with a knowledge of the German language by reason of its easy style, its clear mode of presentation and its most fundamental sizing up of the difficulties in this expanding field.

Heidenhain, Martin. FORMEN UND KRÄFTE IN DER LEBENDIGEN NATUR. [Julius Springer, Berlin.]

This delightful study is of a type too rare in English natural science. The complexities of biological activities as seen either from the aspects of structure or function are often too much for most of us, working as we are with imminent questions of immediate necessity.

It is then all the more needed that we should be able to leave our consulting rooms and browse in fields of theoretical applications of fundamental questions of the mechanisms at work behind the various complexities which demand practical observation.

How organs get to be what they are; what inner processes of synthesis and syntonie bring them to their structural status; what is histophysiology? These and related questions have been made necessary with the growth of analytical histology which would tend to linger on in static form of pure description and classification of the findings. The economic function, *i.e.*, the infusing dynamics, however, ever challenges the thinking observer and it is into this field that these interesting thoughts would lead us. While morphology can teach much, without a functional aspect it remains more or less sterile. The newer dynamic morphology or synthesiology as the author would name it is a living discipline and in no more interesting place can we find some of the problems of embryological dynamics discussed than in this delightful essay.

Schaffer, N. M. SELECTED ESSAYS ON ORTHOPEDIC SURGERY. [G. P. Putnam's Sons, New York and London.]

In recent times "*the organism as a whole*" has become a welcome slogan, especially for the neurologist who has always thought of the nervous system as that "integrator of function" that has made man a unity. These essays are of interest to the neurologist because their author had left the isolated specialism of orthopedics, although a master in its details, and had glimpsed that integrative factor that made his specialty but a special application of man in his entirety.

Special comment is unnecessary for here the main accent bears upon the author's wider vision of bone and joint illness as but particular instances of general disturbance in which a knowledge of the nervous system in its larger issues is indispensable.

OBITUARY

ARNOLD PICK

Arnold Pick's life work was ended by death April 4, 1924. For two years he had lived in retirement, but not in inactivity. His thought and pen were still occupied with the work which, with advancing years, he had laid aside only in its external responsibilities.

He was born in 1851 in the Iglau region of what is now Czechoslovakia. He received his education first in his native province and then proceeded to Vienna, where he received the degree of medicine from the University of Vienna in 1875. Even in his student days in his association with Meynert, and later in work with Westphal, he had the opportunity to acquire and develop that mastery of technique which formed a basis for his thorough and extensive investigations into the fields of neurology and psychiatry. His contributions from single brief reports to his elaborated study of aphasia, *Die agrammatischen Sprachstörungen*, range throughout the whole territory of these two branches of medicine which he made his own. A survey of his titles, running into the hundreds in numbers, reveals the gradual growth of his interest, as it nourished itself upon what he had discovered ever to spread into some new avenue of investigation.

He early became assistant to Westphal at the Charité in Berlin. He returned shortly after this to his native land to fill successively the position of assistant physician at the asylum, Wehnen, and that of second physician at a similar institute in Prague. Here, three years after graduation, he attained the rank of docent in neurology and psychiatry. He became director in 1880 of the Bohemian national asylum in Dobrzan, and six years later was advanced to the position of professor ordinarius in psychiatry in Prague. Here he continued until his retirement two years before his death.

Pick's opportunities within these latter positions were limited by lack of facilities for research and furthermore through an atmosphere of petty personal hindrances, even political opposition. Yet this indefatigable worker, whose one passion in his activity was the representation of the truth, never ceased his labors nor permitted himself

other than a continuously progressive attack upon the problems that engaged his scientific attention.

His earliest works concerned the minute investigation of the spinal cord. His pioneer achievements often passed out of sight as such because of the further discoveries into which they led. This was a matter of small concern to a genuinely scientific spirit such as his. He brought to light the origin of the fibers of the spinocerebellar tracts in the axis-cylinder processes of the ganglion cells of Clarke's column. He described an abnormal position of this column and found heterotopias of gray substance in the posterior columns and observed other abnormalities of the spinal cord. His studies of



spinal muscular atrophy gave support to the theory of primary disease of the anterior horns. His chapters in Eulenburg's *Realenzyklopädie*, treating of various phases of the pathology of the spinal cord, are among the foundation studies in this territory of neurology.

Pick's association with Otto Kahler, who had studied with Charcot and Duchenne, was productive of many joint publications. The clinical picture of combined systemic disease was established; post-hemiplegic motor disturbances, hemichorea and hemiathetosis, were found associated with foci in the thalamus and lenticular nucleus, and so it was assumed that stimulus went out from these foci to the pyramidal fibers, passing through the internal capsule. Syringomyelia and hydromyelia, acute ataxia after infectious disease, acute progressive paralysis, and Charcot's amyotrophic lateral sclerosis were studied in this period. The absence of the tendon reflex in high spinal cord lesions, later known as Bastian's law, was first

observed, and the finer structure of the oculomotorius nucleus was traced.

Pick then went on to develop his knowledge of brain localization and with it the phenomena of aphasia, bringing testimony which established the validity of Wernicke's "aphasic symptom complex." Pick acknowledged himself deeply indebted to the studies of Hughlings Jackson for his stimulus to investigation of the problems of aphasia. He laid especial stress upon the fact that there is here a functional disturbance. At this point, as indeed in all his work, he viewed the problem from the psychological aspect of nervous function, believing that thus only could a deeper insight into disorders be obtained.

In 1907 he showed before the International Congress for Psychology, Psychiatry, and Neurology in Amsterdam that circumscribed senile atrophy attacks different "organs" of the brain and electively functionally similar chains of neurons. Thus the function of a system is affected and there exists a focalized affection in the narrower sense. He embodied this conception in his already mentioned work on agrammatism. The underlying principle of his study is this, that the sentence, not the individual words, embodies the psychological unity, and aphasia, therefore, is a disturbance of this sentence structure. Disorders of speech are to be investigated as related to different levels of linguistic understanding. From his point of view, Pick discovers and discusses symptoms usually little heeded.

He examines the significance of the acoustic speech center as an inhibitory organ of the speech mechanism. He recognizes agrammatism as the result of focal disease. He establishes through his psychological study of motor apraxia the picture of ideomotor apraxia. Echographia and micrographia receive his attention, the latter as illustrated within himself. A theme which continued to engage him to the end was the influence of speaking upon thinking.

Other problems of neuropathology and psychiatry were illuminated by his studies upon the brain. He found among other symptoms that an initial manifestation of arterial sclerosis may be referred to disturbance of cerebral sensibility of a spinal type. He traced through the rabbit the topographical relation between the retina, the opticus, and the decussated tractus opticus. He discovered a large fiber bundle in the medulla oblongata, which now bears his name. He studied hallucinations due to central defect of the sensory apparatus. In his investigation of the initial stages of paranoia he pointed to the significance of the affect in the psychoses.

Thus might be reviewed in still greater detail, as has been done

by Otto Sittig of Prague (*Arch. f. Psych. u. Nerv.*, 72, 1924, No. 1), the vast extent of Pick's work, with its unmeasured effect upon the progress of neuropathology and the psychological understanding of the disturbances which arise. Normal function, as well as pathological disorder, is better comprehended through his contributions to the stream of knowledge. For his method was always that of the historical critic who kept his gaze upon that which had already been attained. His own work might be only a part of that ever increasing whole. And especially in his fruitful thought upon the problems of speech has he found and passed on a peculiar means for furthering the knowledge of function and of structure in health or in disease. One cannot close this but brief sketch of a large figure in neuropsychiatry without at least a mention of the great courtesy and gentleness of this ideal gentleman and scholar. His was a most delightful and engaging personality, and his gracious smile, delicate wit, and polished manner will make his loss all the more regretted.—JELLIFFE.

N. B.—All business communications should be made to *Journal of Nervous and Mental Disease*, 64 West 56th St., New York.

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ORIGINAL ARTICLES

THE SIGNIFICANCE OF THE FRONTAL BRAIN WITH RESPECT TO THE HIGHER PSYCHIC FUNCTIONS

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PREFACE

In the infancy of medicine, anatomy, and physiology it was held that the pectoral and abdominal organs were the seat of the life and the soul. Primitive man saw them constantly in operation in himself and others, in the pneumaferous (air-bearing) arteries the life-spirit constantly pulsating, especially when the sensations of hunger, thirst, sexual excitement, fear, anger, and vengeance increased their functions. The proof of these conceptions is exemplified also in Holy Writ: "*He said in His heart*"; "*He who tries the reins and the heart.*" In the words of Jehovah: "*Is not Ephraim a dear son unto me, the child of my love and delight? When I speak of him, when I remember him, my bowels are moved because of him and I have mercy upon him.*" With such reasoning of the ancient thinkers and physicians, the healing art spread amongst the people and we find examples in every language: in the Latin word, "*recordari*" (to remember; in the English expression, "*to learn by heart*"; and in the French, "*apprendre par coeur*," the patina whereof no one would disturb. The ancient Greeks placed the feeling in the thymus gland, and the mind in the central tendonous part of the diaphragm (*musculus phrenicus*). According to Descartes, in spite of his more enlightened

ideas, the uneven pineal gland in the interior of the brain solely governed the psychic functions. I am inclined to the view that the Latin "*frons*" is derived from the Greek *φρῆν* (*phren*).

As the result of physiological research, heart, kidneys, bowels, and thymus must abdicate and surrender their sovereign rights in favor of the brain. There is only a single exception stated by Ludwig Braun in his recently published work, "*Herz und Psyche in ihren Wirkungen aufeinander*," where the *feeling* of fear but not the *image* thereof (the latter being a product of the brain) is explained as an original phenomenon of the functional disorder of the heart, depending on its ganglion cells. In his opinion this is a specific, elementary sensation of the heart, as the sense of touch is peculiar to the skin, and the perception of light and sound to the eye and ear. I agree with this view.

Recently some brain physiologists have claimed that the frontal brain—contrary to both the general scientific and the popular conception—has no more to do with the higher mental powers than the other parts of the brain. Against this view are numerous arguments afforded by the study of brain physiology, clinics, comparative anatomy, anthropology, and experiments on animals, and these pages are directed to such. This question cannot, I believe, be too much emphasized.

JULIUS DONATH.

BUDAPEST, *January, 1924.*

THE SIGNIFICANCE OF THE FRONTAL BRAIN WITH RESPECT TO THE HIGHER PSYCHIC FUNCTIONS

Pronaque cum spectent animalia cetera terrain,
Os homini sublime dedit caelumque videre
Iussit et erectos ad sidera tollere vultus.

OVID (*Metamorphoses I*).

It has always been the general popular view and artistic conception, beginning with the ancient Greek plastics, throughout the Renaissance, right up to modern art, that the almost perpendicular forehead and boldly prominent nose are the most characteristic features of the human face in contradistinction to the head of the animals. This is manifest also within the races of mankind, by comparing a higher race with a lower, and the cultured peoples of yore with the modern types. The Camper facial angle, which in the Caucasian race amounts to 80°–85°, in the negro to 70°, and in the

young ourang-outang to 67° , reaches 90° and more in the statues of the gods and demigods of Ancient Greece, in order to express superhuman attributes, as we may see especially in the *Zeus* of Phidias and the *Apollo Belvedere*.¹ And, on the other hand, the low receding foreheads in fauns and satyrs are intended to render conspicuous the animal propensities.

It has remained for modern neurological investigators, like Monakow, Munk, Vigouroux, Bruns, Edward Müller, Nissl von Mayendorff, and others, either wholly to deny the psychic significance of the frontal brain or else to make it appear of no importance. The cause thereof seems to me to lie in the brilliant results of the experimental brain physiology begun by Fritsch and Hitzig in the year 1870, which first showed that certain areas of the convexity of the brain are excitable by electricity and evoke muscular twitchings on the opposite half. Three years later Ferrier published his stimulating researches in which he—unlike the first investigators—employed the faradic current instead of the galvanic; while Beevor and Horsley in 1887 succeeded in ascertaining a more subtle arrangement of these centers with reference to the single parts of the extremities. These visible phenomena, which could be represented objectively, quite particularly captivated the investigators in this sphere. The researches made in connection with the sense areas proved more difficult; although at the attempts at extirpation of the extremity areas, Fritsch and Hitzig had already perceived, simultaneously with the motor paralysis, also the blunting of the entire sensibility.

With regard to the study of the localization of the area of sight and hearing, which was especially pursued by Munk, Goltz, and Luciani, by extirpations on the occipital lobe, and by Munk and Kalischer on the temporal lobe, here the clinical observations as well as the anatomical and histological researches gave richer results. Naturally the least results were to be expected from experimental studies of animal brains concerning psychical functions which could be applied to low and narrowly limited ones only. But even in this respect success was not entirely lacking. As to the greater attraction exercised by the easier and more fruitful study of the motor functions upon the investigators, I would ascribe it mostly to this: that in the beginning there was less interest for psychic phenomena, as one could not well begin with the ancient classical introspective psychology,

¹ The stronger projection of the forehead in the child as compared with the adult, the skull bulged in rickets and hydrocephalus, are not here considered, though it may be mentioned that the light hydrocephalus discovered at the post mortems made of Cuvier, Helmholtz, Menzel, and recently of Häckel, may as a moderate irritation have promoted the mental functions.

while experimental psychology had first to be created by Wundt. Since that time a great many clinical observations have impressively shown the psychic significance of the frontal brain.

MOTOR CENTERS OF THE FRONTAL BRAIN

The opponents of the localization of the higher psychic functions in the frontal brain admit motor functions only. Among these, the motor (Broca's) center of speech is certainly localized in the posterior third of the left third frontal convolution. It is a phylogenetically new formation of the human brain, as it is found only rudimentally in the anthropoid ape.²

According to Mingazzini, the verbal impulses do not proceed from the left but from the right Broca area, traversing the anterior part of the corpus callosum and uniting with the left side. Moreover, the direct fronto-pontine tract (tractus fronto-pontinus) conducting over the bridge to the cerebellum and serving as a fronto-ponto-cerebellar tract for equilibrium functions. Their exact origin in the brain is uncertain. Flechsig locates it in the first, Dejerine in the third, and Brodmann, according to more recent views, considers as most probable to first and second convolutions. Some authors—such as Gerstmann and Monrad-Krohn—deem it an equilibrium center superordinated to the cerebellum, which exercises a consciously regulating influence upon the opposite cerebellar hemisphere, while the latter is unconsciously exercising its equilibrating activity. The "frontal ataxy," first emphasized by Bruns, is a symptom so frequent in tumors of the frontal brain that it is a diagnostic rule in cases of cerebellar ataxy to think on the possibility of a frontal seat of the disease, and not rarely the tumor sought for—at the operation in the cerebellum—is found at the post-mortem in the frontal brain.

² In some textbooks it is erroneously asserted (thus Heilbronner in Lewandowsky's *Handbuch der Neurologie*, Vol. I, p. 1067) that Broca in the year 1861, was the first to report frontal lobe lesion as a cause of speech disturbance. Grasset (*Des Localisations des Maladies cérébrales*, Paris, 1880) has called attention to the fact that the medical practitioner Marc Dax (Senior) made a communication to the Montpellier Congress in 1836, founded on numerous observations, under the title: "*Lésions de la moitié gauche de l'encéphale coïncident avec l'oubli des signes de la parole.*" Dax, Junior, worked further in this direction and submitted a paper to the Academy of Medicine (March 24, 1863) entitled: "*Observations tendant à prouver la coïncidence constante des dérangements de la parole avec une lésion de l'hémisphère gauche du cerveau.*" Just eight days later (April 2, 1863) Broca submitted a treatise relating to eight findings on "*aphémie*," in which, curiously, the seat of the lesion was always left-sided, but "*je n'ose tirer de là une conclusion, et j'attends de nouveaux faits.*" Truly, by means of further investigations, the more exact localization was established. I will here recall that Hippocrates emphasized the occurrence of speech disturbances in right-sided paralysis.

Afterwards Bárány, in the year 1913, called attention to the fact that tumors of the frontal brain, wherever situated, can bring about cerebellar as well as vestibular symptoms. Szász and Podmaniczky, in the year 1917, found in injuries of the frontal brain (their findings being confirmed by A. Blohmke and Frieda Reichmann, and also by M. Mann), that here also spontaneous past pointing (*vorbei zeigen*) can be demonstrated in the minority of cases, but can be attained easily by cooling off the skin-covered area with ethyl chloride. This reaction takes place also in the ponto-cerebellar tract.

Moreover, there are projection fibers conducting from the frontal brain to the subcortical ganglia, that is, from the convexity of the prefrontal region (from the second and third, and partly from the first convolution) within the area of the corona radiata in the anterior crus of the inner capsule, respectively through the head of the nucleus caudatus.

Association fibers must also be added, which unite the cortex of the frontal brain with other parts of the cortex—*i.e.*, the long associate fascicle, known as *fasciculus arcuatus* or *fasciculus longitudinalis superior*—which pass from the second and third frontal convolution partly sagittally to the occipital lobe, partly in arcuate form to the vertex of the temporal lobe.

Further, an important associate tract is Monakow's fronto-central fascicle, which conveys the motor impulses from the frontal brain to the anterior central convolution.

Two other motor centers are the graphic and the motor-musical centers, whose localization is uncertain. Both are placed in the second frontal convolution, and particularly the graphic in the left, and the motor-musical sometimes in the left (Edgren, Probst, Larionowa, and others) and sometimes in the right, especially in the foot of the frontal convolution (Mann, and recently Kurt Mendel). The sensory musical center was admitted by Probst to be in the foremost part of the first left temporal convolution. Now it is worthy of notice that they border immediately on the center for the movement of the hand and the fingers in the middle of the anterior central convolution, similarly to the center of the motor speech bordering on those of the tongue, gullet, jaw, and larynx in the foot of the central convolution.

With regard to the graphic center, Exner, Charcot, Pitres, Ladame, Bastian, Sciamanna, and Gordinier agree as to its location in the second left frontal convolution. Others, like Pick and Wernicke, assign its seat to the medulla of the lower parietal lobe corresponding

to the gyrus angularis. Evidently the visual tracts passing underneath them to the occipital lobe are affected by lesions situated here, and the intactness of these tracts is indispensable to the mediation of letter-images to the center of the hand and finger movements. Mingazzini's view is, however, that lesions of the inferior parietal lobe, and especially of the left gyrus angularis, are connected with disturbances of reading, which are independent of aphasic syndromes.

While agraphia is usually found in lesions of the second left frontal convolution, motor amnesia is met with on the right as well as on the left side, which may be attributed to the use of both hands in playing on musical instruments. Thus it seems there are engrammes (images) deposited in the frontal brain, which, together with the impulses of the will also enacted here, move the motor centers. In Broca's center the speech-moving images set in motion the bordering centers of the muscles of the face, tongue, pharynx, and larynx in the anterior central convolution, just as a piece of wonderfully constructed machinery works harmoniously on the mere pressure of a button. From the graphic and musical center in the second frontal convolution the impulses are conveyed to the neighboring hand and finger centers. On the whole, the recollection of images, the ideas, as well as their comparison with each other, and our assertion in judgment, the pondering of actions, and the decision to carry them into effect, occur mostly in the frontal brain; and then follows the impulse to the centers of the single muscles or groups of muscles. *Beginning from the cortex of the central convolution the movement is purely mechanical*, the ganglion cells there appearing only as intercalary organs, so that the motor apparatus can be put in motion from here by purely mechanical or chemical external irritations, which cannot be effectuated from the frontal brain as a so-called "thumb-region," except by a disproportionally strong stimulation, as by tumor pressure in focal epilepsy, or branches of a strong electric current transmitted from the neighboring area to the central convolution. *Thus the frontal brain seems to be physically superordinated to the motor centers of the anterior central convolution.*

A paralysis-like weakness of the muscles of the neck and back is often observed in frontal brain tumors, so that such patients cannot keep their heads erect. It was thought that their motor centers must be located in the frontal brain, especially since Munk seemed to have given an experimental basis to this idea. This investigator observed in the dog an abnormal arching of the back and lumbar vertebral column after the extirpation of both frontal lobes, and a curvature

like a cat's back in the ape. Later investigations of Sherrington and Grünbaum, however, by means of faradic stimulation in the chimpanzee, showed that the centers of the trunk (the muscles of the abdomen and of the chest) are situated in the anterior frontal central convolution.

Two questions still remain to be discussed here, namely, whether the symptoms like Parkinson's disease in frontal brain tumors, and also whether incontinence of urine and feces are to be regarded here as local signs. P. Schuster, in the Berlin Society for Psychiatry and Nerve Diseases, demonstrated two endotheliomas of the size of a small apple proceeding from the meninges. In the one case the second and third convolutions were those crushed in and dislocated; in the other, the entire frontal pole was pressed in. Both patients showed the well-marked features of paralysis agitans without the general or distinctly focal symptoms. One of them (a woman of thirty-four years, with right-sided endothelioma) had, during three years, trembling and increasing stiffness of the right hand, typical behavior and expression of countenance, propulsion, negatively declining emotions, good humor, and jesting. The other (a man of seventy-five, with left-sided frontal brain tumor) showed the gait and bearing of paralysis agitans, slight trembling and stiffness of the extremities. At first the diagnosis ran: Tremor senilis, then paralysis agitans. Bostroem had earlier noted these symptoms resembling Parkinson's disease in a case of double-sided frontal brain tumor. For this phenomenon, as well as for the akinesia and disturbances of equilibrium, he assumes a lesion of the fronto-ponto-cerebellar tract.

I myself have observed two cases of a complex of symptoms like paralysis agitans in young persons after epidemic encephalitis. The one (a boy of thirteen years belonging to a healthy family, and who had always enjoyed good health), fourteen days after an attack of "Spanish flu," showed stubborn sleeplessness at night, though during the day—especially in the forenoon—he would sleep. A year after the beginning of the illness he suffered from spasms and trembling of the limbs, with exaggerated tendon reflexes. For a time there was double vision, and yet in the examination there was a uniform limitation of the movements of the eyes but without any trace of double vision. Most of the time he lay on a sofa or sat in a chair, supporting his head on the back thereof. In walking he required support, whereby propulsion and retropulsion could be easily provoked. There was fixed expression of countenance; the voice was low and monotonous. The former good-tempered lad had become irritable; yet his intelligence remained unimpaired, and it was solely owing to his restlessness at night (which rendered it impossible to keep him at home or in a hospital for internal diseases) that it was deemed advisable to place him in an insane asylum.

The other patient (a peasant, aged twenty-one years), likewise formerly healthy, had encephalitis lethargica two years previously. Invincible lethargy lasted fourteen days. Taken ill in 1919, in the meantime (in the following year) he was attacked by "Spanish influenza," with fever, cough, and headache lasting eight days. Since that time the formerly efficient workman can work but slowly, though quite well. He sits quietly alone, with bowed head, attentively following things around him, directing his eyes and head towards the objects of his attention. His responses are correct, and he writes properly to his relations, though he quickly becomes fatigued with the exertion. He eagerly reads the newspapers, which he explains to his mother. Any printed paper lying on the ground he will pick up and read, afterwards throwing it away. He can play cards with his fellow patients; he takes an active interest in his treatment, and gives a good account of himself when I visit the patients.

For these cases, which were consecutive states of epidemic encephalitis, presenting nothing striking mentally, as well as for the others with frontal brain tumors showing the Parkinson symptom-complex, I am of opinion that we have to do with encephalitic changes in the corpus striatum,³ as F. H. Lewy, O. and C. Vogt, and A. Takol have shown, or in the case of frontal brain tumors with neighboring symptoms, effected by the pressure of the tumor upon the corpus striatum. Katharina Gürtler deduces also in frontal brain diseases the Parkinson-like symptoms from the lesion of the connections of the frontal brain with the stem ganglions, the pons, and cerebellum.

With regard to the further paralysis symptoms as in frontal brain tumors, there is frequently incontinence of urine and feces. This led some authors, such as Schob, to the conclusion that there is, in the frontal brain, a center for the sphincters of the bladder and rectum. In my view, however, it is a result of lowered perception, apathy, loss of will power, stupor—in a word, a demented state. Also with the babe, which cannot keep itself clean, there is no paralysis of the sphincters, but it is a matter of a not yet impressed

³ Hubert and Friedrich Hoffmann made an observation similar to those of Bostroem, Dimitz, Schilder, and P. Schuster. A man of thirty-four years, previously in good health, in the course of fifteen months showed impaired memory and retardation of movements resembling Parkinson's disease, with tremor, general muscular rigidity, and ataxy of the trunk, together with a high liquor pressure. Later appeared symptoms of affection of the pyramidal tracts, choked discs, besides disorders of the bladder and rectum. The diagnosis of the frontal-brain tumor was confirmed by the post-mortem: A glioma was found in the anterior part of the corpus callosum, the septum pellucidum, and especially in the dorsal parts of the white substance of the frontal brain on both sides of the level of the anterior border of the nucleus caudatus. Only in one place the tumor reached also the cortex of the second frontal convolution. The basal ganglions showed only microscopic changes: On the anterior border of the nucleus caudatus some proliferating ganglion cells and in the lateral border some fresh hemorrhages.

conception of suppression. Sherrington and Grünbaum found, in the chimpanzee, the center for the vagina and anus on the uppermost end of the anterior central convolution above the leg center. We may presume the center for the bladder to be also there.

NEIGHBORING AND REMOTE SYMPTOMS⁴

In frontal brain tumors are frequently found neighboring and remote symptoms. To the *former* belong Jacksonian epilepsy, paresis, or paralysis of the opposite extremities, including the facial nerve—though these may occur also on the same side. These are actions upon the anterior central convolutions and the pyramidal tracts departing from them. It depends upon the intensity of the mechanical influence whether at the beginning there exist only the mechanical symptoms of irritation, which are manifested either in spasms and the increasing of tendon reflexes or else in paralysis and weakening of the reflexes. Here belong also disturbances of the sense of smell, caused by pressure upon the olfactory tract which passes at the base, especially on one or also on both sides. The *remote effects* are vestibular disturbances of equilibrium associated with nystagmus, likewise paralysis of the muscles of the eye, especially of the abducens. The general symptoms of brain tumor—choked disc, which usually appears earlier and stronger on the same side, also headache, vomiting, numbness, apathy, and somnolence—are the consequences of cerebrospinal pressure, which may be caused by a space-restricting process, wherever situated in the cranial cavity. By this, one must note that these so-called general symptoms are partly merely local manifestations of generally increased cerebrospinal pressure. Therefore, in choked disc the optic sheath, in headache the meninges, in vomiting the vagus nucleus, and in epileptic seizures the motor cortical fields as well as the vasomotor center, are particularly exposed to pressure.

THE HIGHER PSYCHIC FUNCTIONS OF THE FRONTAL BRAIN

In the first place may be adduced the observations which tell against the rôle of the frontal brain in the discharge of mental func-

⁴ A clinical confirmation for the cortical center of the bladder is given by the observations of Paulian and Topa. A man (thirty-two years) at the age of six years suffered a fracture of the skull for which he was trephined. In July, 1921, there suddenly ensued complete incontinence of urine, stubborn constipation, slight left-sided symptoms, memory disturbance, fits of unconsciousness, dizziness. On the vertex was an extended scar. After trephining, on the removal of the scar, was found a callus of the tabula interna with adhesion of the dura mater. The callus was removed and a plate of celluloid inserted. Immediately the bladder disturbance disappeared, also the dizziness, and the patient recovered.

tions, for from time to time are being published such as emphasize the lack of psychic findings in lesions of the frontal brain.

It was thus in a case of Ruckert's, where the tumor occupied both frontal lobes and the anterior parts of the corpus callosum. There were trigeminus and facial disturbances—the latter being on the right side—nystagmus and disturbances of equilibrium, though no particular psychic disturbance was noticeable.

In a case of injury to the prefrontal right lobe, which led to loss of the brain matter of the entire upper and middle convolutions of the anterior part of the orbital surface of the right prefrontal lobe, Ascensi saw no remarkable influence upon the mental processes, at most a slight diminution of imagination and of the intuitive faculty.

B. Pfeiffer's analysis of thirteen frontal brain tumors, from the rich material afforded by the psychiatric and nerve clinics of Hallé, is especially noteworthy. He found that defects of intelligence and disturbances of judgment are not remarkably frequent in comparison with other tumors. Only in speech and statics are any focal symptoms manifested.

Serog found three cases of frontal brain tumor without any specific psychic disturbances, and his idea is that the frontal brain cannot be regarded as the seat of the intelligence.

Petrina's patient with a large sarcoma of the left frontal lobe exhibited no symptoms whatever up to a short time before his death. Owing to the complete absence of intellectual disturbances he concludes that the frontal brain cannot be the seat of the higher mental functions.

Prince. A tailor, aged thirty-four, in a state of depression, shot himself with suicidal intent, inflicting a bullet wound which resulted in an abscess in the level of the second left frontal convolution. He was reduced to a condition of mental confusion, then epileptic fits on the right side. A part of the injured second convolution was also emptied by the drainage. Neither the scar formation, nor the abscess, nor the presence of the projectile, showed any action detrimental to the intelligence of the patient. With the removal of the infection the depression also disappeared and the patient was cured.

Newmark observed four cases of prefrontal tumors removed by operation: (1) An endothelium of the tabula interna of the skull and of the exterior dura surface; (2) an angiosarcoma of the dura mater; (3) a gliosarcoma in the foremost anterior part of the left frontal lobe; and (4) the same finding in the right frontal lobe. These were followed by the loss of the sense of smell on one or both

sides. The eye on the tumor side was earlier or more strongly affected, but no psychic symptoms are reported.

A. Gordon relates four cases of different lesions of the frontal lobe, which suggested cerebellar disease; there were distinct cerebellar symptoms in each case: ataxy in one of the extremities, dysmetry (hypo- or hypermetry), gait with the inclination to walk or fall sideways, and one-sided change of the tendon reflexes. No psychic symptoms except in one case of jesting (*Witzelsucht*).

O. Rossi saw in frontal brain injuries neither psychic symptoms nor motor disturbances which could be conceived as focal symptoms of the frontal brain.

Ranschburg describes a bullet wound received in the war and followed by an abscess of the size of a child's fist in the right frontal lobe—a pneumocyst communicating with the ethmoid bone. The pole of the right frontal lobe and the predominant part of its medullar substance were destroyed thereby. The neurologic-psychologic examination revealed no perceptible change in the higher mental functions, of the faculty of conception, formation of analogies and abstractions, of the ego, the memory, the character, the power of judgment, the attention, the will, nor of calculation. Only in the reproduction of newly formed word combinations could a slight backwardness be perceived. Nevertheless this author emphasizes that the left frontal lobe remained intact.

Opposed to these negative findings are so many positives that the contradiction cannot be explained otherwise than that the frontal brain tumors, as it is known, may occasionally during lifetime cause no remarkable phenomena, or at the end some merely insignificant, and the tumor constitutes an unexpected finding on the post-mortem table; or the examination did not proceed far enough, or it was performed with inadequate means. Likewise tumors of slow growth, which merely thrust aside the parts of the brain, need not destroy and vicariation may at length take place. However, I am inclined to think, with regard to the great majority of these negative cases, that on attention being called to them a closer examination would have shown psychic changes or defects. Later on I will refer again to what subtle psychic changes often happen.

FOCAL DISEASES OF THE FRONTAL BRAIN, IN THE FORM OF PROGRESSIVE PARALYSIS, SCHIZOPHRENIA, AND HIGH-GRADE DEMENTIA

Especially interesting are the focal diseases which show intellectual decay in the form of general paralysis, or schizophrenia, or high-grade dementia, without other complications.

Forms Similar to Paralysis

Bernhardt and Borckhardt at first pronounced a case as one of general paralysis, which afterwards developed aphasia, hemiplegia of the right side, and general tumor symptoms. It turned out to be a large tumor in the medulla of the left frontal brain.

Sullivan reported two cases of prefrontal tumor in criminals. The crimes were committed in a childishly careless manner reminiscent of the deeds of paralytics. No particular disturbances of intelligence were discovered.

Van Gehuchten, in a case where the fibrous tumor had issued from the wall of the right orbit, causing a compression of the whole of the right and a portion of the left frontal brain, ascertained that the person afflicted had latterly developed quite a wicked character.⁵

Witney reports the case of a large endothelium situate chiefly in the right frontal lobe but extending to the left. The patient, who had great musical talent from his youth, being both a composer and conductor, at the age of thirty fell into a state of nervous debility which compelled him to resign his professional activities. Periods of nervous prostration followed one after another, with great depression, absolute disappearance of ambition of any kind, and the patient would not even move from the spot. The whole condition slowly developed during fifteen years. The final stage set in with transitory loss of consciousness, somnolence, and gradual diminution of the intellectual faculties, a symptom complex very similar to general paralysis.

⁵ If Gehuchten deduces from this single case a psychic preponderance of the right frontal lobe, it is unjustifiable, because the *left lobe also* was affected. There are in fact observations which show psychic changes for left-sided areas, like those of Bernhardt and Borckhardt above mentioned, as well as for right-sided ones like those of Dercum. Dercum relates the case of a man, aged fifty-nine, who fell upon the left side of his head. He experienced a sudden twitching in the left arm, accompanied with headache, dullness, and loss of consciousness. A large sarcoma was discovered under the cortex of the right frontal brain. Though generally the left frontal lobe predominates, if we consider only the presence of the center of speech, the right lobe also participates. Thus in a case of Craft's, relating to a man whose head was severely injured, two sarcomas developed one after the other. The patient exhibited indolence, lack of interest, writing and spelling gave him trouble, so that he was obliged to dictate his correspondence, while he had difficulty in understanding what he read or was said to him. At the first operation no substratum was brought to light; and two months afterwards, on account of the increasing focal symptoms, he had to be operated upon again in the same region of the head. On this occasion a sarcoma was removed, and six weeks later, after similar symptoms, an emerging sarcoma of the same mixed cellular structure was removed. The psychic disorders now subsided and only a left-sided hemiparesis remained. At all events it seems, from the observations of the world war, that the left hemisphere, and especially the left frontal lobe, prevails with respect to the functions of the memory in general.

Most remarkable is Rosenheck's case of cerebral neoplasm simulating dementia paralytica with operation and complete recovery.

The patient of fifty fell sick fifteen years ago, a few months after an easy injury of the skull. He developed headaches which became intolerable in the course of years. Since two years a change of character is perceivable: the patient is neglecting his profession, is undertaking phantastic financial transactions, is giving away his fortune, his retentive ability is troubled, he shows alternating periods of depression and exaltation, and jesting. Since one year there is a weakening of vision, diplopia, increase in weight, and there have been two epileptic fits with loss of consciousness. Objectively there are to be found signs of pyramidal lesion and facial paresis of the central type, both on the left side, choked disc, normal pupillary reactions. There are no pathological findings in the serum and cerebrospinal liquor. On operation a large endothelioma is found issuing from the dura of the right fronto-parietal region. Extirpation, recovery.

Forms Similar to Schizophrenia

M. Rosenfeld relates the case of a young rifleman of twenty years, who was shot through both frontal lobes by an infantry projectile. From the position of entrance and exit it was established that both frontal lobes had been penetrated in the level of the first and second convolutions. After the injury there was a brief period of unconsciousness, and during the first three days slight symptoms of brain pressure. A psychic disturbance of two months' duration supervened, so much like catatonic stupor that "anyone not knowing the history of the condition would have without hesitation pronounced it a catatonic stupor." The patient evinced no spontaneity in his actions, he sat constantly in a stupor, was incontinent of urine and feces without showing any sign of personal inconvenience through the uncleanness. He did not swallow the food put into his mouth and allowed the liquid food to escape. He merely from time to time gave forth an affected laugh. In the course of three months, however, his condition improved by degrees until normal behavior was attained and he was fit to resume his military duties. Up to that time there existed a disturbance of gait reminiscent of cerebellar asynergia, by which the patient—at every attempt to walk or stand—made awkward motions with his body and limbs. "This clear case of frontal brain injury, which shows the conditions of an experiment, in the opinion of this observer, supports the supposition that the frontal brain in man serves actions of will, therefore also certain higher psychic functions."

In the case of a tangential rifle-bullet wound over the middle of the first and second frontal convolutions on either side, E. Forster observed no defect of intelligence in the restricted sense but a lack of impulse with cataleptic symptoms. The conveyance of thoughts on movements was disturbed in spite of the sustained engrams of the individual actions and their consequences. The author does not see in this lack of impulse the result of an affective disturbance, but a direct focal symptom, just as in the cataleptic symptoms the result of frontal brain injury.

In the case of a patient shot through both frontal lobes, Schob saw, in the first instance, serious disturbances of consciousness with delirious unrest. Later appeared lack of spontaneity, loss of interest, difficulty in reasoning, inclination, perseveration, and stereotypy, somnolence, inclination to yawn, swallowing, outbreaks of perspiration, lowering of the abdominal and tendon reflexes. As a permanent condition there remained impaired memory, disproportionate decrease of intelligence, dullness, lack of intuition, euphoria, moderate irritability, impulsive running away, thoughtless actions. This observer regards a profuse perspiration quite as much a local symptom as lack of spontaneity. In his opinion the catatonic symptoms can be strongly restored.

Dimitz and Schilder observed in a female, a few weeks after receiving a blow upon the head, loss of initiative, of agility, and of interest, as well as disturbances of equilibrium and occasional trembling fits; later constant trembling in both extremities, with hyper-tonia which affected the entire body with increasing numbness. Post-mortem: a tumor proceeding from the septum pellucidum, which thrust the pillar of the fornix into the ventricle and grew into the foremost part of the corpus callosum, and thence into the basal parts of the frontal brain. The right frontal lobe was especially to a great extent occupied by the tumor.

Bostroem also, on the ground of four observations of frontal brain tumors, besides trunk ataxy and somnolence, emphasizes want of activity and stubborn perseverance in attitudes.

Forms of High-Grade Dementia

In a neoplasm of the size of a hen's egg in the anterior fossa, Curti observed, along with destruction of the bulbi olfactorii and the frontal lobes, besides the general tumor symptoms (amaurosis), disturbances of the sense of smell, and particularly weakness of memory, states of severe irritation, and idiocy.

Constantini saw unconsciousness supervene after jaundice, and later on spastic paralysis and dementia, which lasted unchanged till death. Post-mortem: Tumor of the size of a hen's egg in the centrum ovale of the prefrontal lobe.

K. Mendel mentions three cases of serious frontal brain injury with remarkable jesting and euphoria.

Especially instructive is the observation of H. Richter: a clear case of idiocy resulting from an isolated lesion of the ganglion cells in the frontal brain. A woman, aged forty-two, formerly intelligent, industrious, and orderly, becomes laconic and finally quite dumb, idiotic, and her formerly plain handwriting almost illegible. The patient had incontinence of feces and urine, and required to be fed; she became dull, apathetic and sleepless. With the exception of somewhat sluggish pupils, there were no somatic symptoms, and particularly no ataxy nor epileptic fits. Post-mortem: Throughout both hemispheres there was a high-grade atrophy of brain matter, on the left side especially. On the right side, chiefly the first frontal convolution, on the left side all the convolutions, of both the convexity and the base, were seriously affected, especially the Broca area. Over the atrophic area the meninges were almost shriveled up. Under the microscope all the cellular elements showed a deficiency, especially the layer of ganglion cells. The central convolutions, the anterior part of the inner capsule, were quite intact. The still preserved nerve cells were altered morphologically in a high degree, while the fibrillae were on the whole spared. The progressive atrophy of the cells, according to this investigator, must be regarded as a primary disease having no connection with the age of the patient. It may be attributed rather to hereditary weakness, and is therefore of an endogenous character, proceeding from a heredo-degenerative basis. The ectodermal elements are thereby favored. To the strong frontal brain atrophy, which concerned the left lobe more than the right, he attributes the high-grade dementia, the disappearance of all memory-pictures which, in the form of stimulation of the will or idea of restraint, mark the act of man as reasonable, the motor unrest caused thereby, the stereotypy, the high-grade loss of interest, and the lack of attention.

Similarly I mention two observations of Gans, also characterized by the lesion being confined exclusively to the frontal brain in the first case, nearly exclusively in the second case. One of these concerns a woman of fifty-four, constitutionally afflicted, who developed gradually total idiocy without paralysis, sensory disorders, loss of

consciousness or giddiness. Post-mortem: A Pick atrophy of the frontal brain was found; a high-grade circumscribed atrophy of the frontal brain (corresponding to the frontal region of Brodmann), and histologically a simple shrinking and fatty degeneration of the nerve cells, especially in the first cortex layer. He emphasizes that in such cases an innate depreciation and hereditary constitutionality play an important part.

His second case concerns a woman of sixty-one who became dull, went about ill dressed, with disheveled hair; she buttoned her clothes in a wrong way, ate everything without discrimination, and could not write any more. In her sixty-fifth year she was admitted in the hospital; she took no interest in her surroundings, started laughing without any recognizable cause. She is continually moving her tongue, saliva is flowing from the mouth, does not talk either spontaneously or on interrogation, and is always crying for a "little dishful of pap," and is disturbing the night-rest of the others with this ceaseless crying. She is wet and dirty in habits. After being sixteen days in the hospital death occurs, caused by influenza. The brain weighed 960 grams. The frontal lobe is very atrophic. The brownly discolored convolutions showed a shriveled surface. The microscopical findings include glands, Alzheimerian changes in the fibrillae, arteriosclerosis, and heavy loss in cells and fibrillae; many cells are heavily shrunk; the atrophic cortex is very rich in fat, contrasting with the well-preserved central anterior convolution. The glia shows fibrous luxuriation, particularly in the white substance. In the white substance of a heavily shriveled convolution the smaller vessels are surrounded by cavities; there are also numerous corpora amylacea. The examination of a Weigert series shows very well the extension of the atrophy; the demarcation towards the normal party can easily be determined macroscopically by the narrowness, darker color, and shriveled surface of the affected cortex. In the frontal brain heavy loss of fibers. The gyrus fornicatus is narrow and not very rich in fibers, but its color and surface are normal, and the loss of fibers is to be considered as sequelæ of the changes in the other parts of the frontal brain. The anterior part of both insulae is very atrophic, the posterior section nearly intact. The gyri longi are, in their greater part, well preserved; the gyri breves, on the other hand, very atrophic. The claustrum and the stem-ganglia appear normal; the third and second temporal convolutions on contrary atrophied, the first one being much less diseased. The atrophy can be demonstrated most conspicuously on a section passing through the anterior central

convolution. In the depth of the sulcus there is to be found a little piece of the cortex of the second convolution in the form of a markedly atrophic part, surrounded with normal cortex of the central type.

As a result of heredo-syphilitic disease of the anterior cerebral artery and the left branch of the Sylvian artery, with resultant sclerosis of the left frontal lobe, Düring saw spastic atrophic hemiplegia of the right side, anesthesia with idiocy.

Here should be mentioned also, as an example of weakmindedness and excitability, the observation of Arevedo. In a girl, twenty-one years of age, with sarcoma of the anterior part of the right cerebral hemisphere, involving the third convolution, the foremost part of the right lateral ventricle, the corpus callosum, the pole of the temporal lobe on the same side and somewhat the base of the frontal brain, psychic disorders manifested, having the appearance of hysterical symptoms: great suggestibility, violent fluctuations of the affections, accompanied by temporary epileptiform attacks.

Marie and Benoist, in a case of pure senile dementia, without motor, sensible, and sensory disturbances, found a tumor under both frontal lobes.

We see, therefore, that, in local diseases of the frontal brain, whether caused by tumors, degenerations, or injuries, there arise forms of mental and moral decay, changes in mood, resembling mostly the psychic symptoms of progressive paralysis, schizophrenia, and other morbid processes leading to dementia. We dare say, therefore, that it depends on the etiologic moments as to whether the frontal brain is injured by spirochetes, that is, by their toxins, or by the poisonous decaying matter of the generative glands, or by arteriosclerosis; that—naturally in simultaneous connection with different other effects—in one case there results the syndrome of paralysis, and in another that of schizophrenia or of senile dementia.

Referring to the case of catatonic stupor dealt with above, which disappeared with the healing of the gunshot wound, it seems probable that schizophrenia first manifests itself as a mere functional disturbance which later leads to incurable organic changes.

The Corpus Callosum

The corpus callosum is the most strongly developed commissural and associative system between both brain hemispheres, with the inclusion of the optic and acoustic center, and probably of both Broca convolutions. With regard to the enormous development which it

shows in the ascending animal series, and running parallel with the development of the frontal and the occipital brain, Marshall was already of the opinion that the development of speech and psychic faculty is connected with the increase of the corpus callosum. There are supposed relations between the optic thalamus, the internal capsule, and the fasciculus on both sides. By means of the ample connections which it establishes between both frontal lobes, it forms an integral part of the frontal brain; so that the lesions of the corpus callosum cause on the whole the same symptoms as those of the frontal brain. The diagnosis of corpus callosum tumors presents, therefore, one of the greatest difficulties of topical diagnostics. Psychic disturbances are almost without exception to be authenticated (P. Schuster, Putnam, and Williams), among them moria and the form of general paralysis. There are found weakness of intelligence, aphonic speech, slight aphasia to loss of speech, besides neighboring symptoms like paresis of one extremity, apractic disturbances, paraparesis, spastic hemiparesis, diminished sensibility to pain and temperature, paralysis of the head-holding muscles, and further (as general tumor symptoms), sluggish reaction of the pupils to light, choked disc, headache, dizziness, epileptic phenomena (Biro, Ch. K. Mills, Hamacher, Guillain, and others). Eupraxia of the left hand seems also to depend upon the intactness of the corpus callosum, for which action especially the middle part is claimed. It is important that in the corpus callosum, where the tracts press closely together as in an isthmus, lesions still in an early stage may provoke psychic phenomena, and in spite of their smallness cause extensive disturbances of the most serious kind. Pagot asserts that the corpus callosum is the organ of the highest mental functions, but essentially conducting paths are in question which provide for the common working out of the sensations and perceptions supplied by both hemispheres of the cerebrum, but not the ganglion cells, from whence proceed the psychic functions. An undeveloped state of the corpus callosum results in serious psychic and somatic phenomena, as in the case reported by Landsberger, which was neurologically and psychiatrically examined *intra vitam*. Recently the Swedish investigator Hultkrantz examined a brain without the corpus callosum. Its owner, as was ascertained from inquiries, evinced no serious motor or intellectual defects and in no way showed himself to be inefficient in practical life. This author could produce a dozen more such cases from literature which manifested only slight mental defects. His

explanation is to the effect that in such cases the one hemisphere alone had undertaken the incitement and the more subtle regulation of all the spontaneous movements of both halves, and that mnestic-associative functions are also confined to the same hemisphere, while the other half remains ineffective. This view accords with the supposition that in the normal brain each hemisphere has at disposal crossed and uncrossed centripetal and centrifugal tracts, but that the uncrossed are relegated to the background, while in the brain devoid of the corpus callosum their exercise was sufficient to adapt them for the functions mentioned.

The significance of the lesions of the corpus callosum in producing psychic disturbances becomes evident by the fact that here both frontal lobes are simultaneously indirectly affected to a great extent. The interesting statistics of H. di Gaspero also go to show that, in regard to the frequency of psychic disturbances, firstly tumors of the corpus callosum arise, then frontal tumors. The occipital, temporal, and parietal tumors follow in order. The cerebellar tumors range from 30 to 40 per cent and the pituitary amount to 20 per cent. The tumors of the brain stem and central territories are the least frequent. Thus moria (joking) is most common in frontal tumors, stupor in tumors in the anterior part of the brain, while melancholia, crepuscular states, hallucinosis, and paranoia are, according to this grouping, not connected either with definite parts of the brain or with particular kinds of tumor. There results an enhanced importance of the left hemisphere over the right. According to these statistics local signs certainly cannot be separated from neighboring and remote symptoms.

THE CLINICALLY ASCERTAINED PSYCHIC FUNCTIONS OF THE BRAIN

The psychic symptoms of deficiency in frontal brain diseases are manifold, according to the situation, intensity, or extent of the focus, the slower or quicker development, moreover whether there is also possible a certain degree of vicariation, whether the parts of the brain are displaced, compressed, or destroyed. From the kind of psychic disturbances we shall be able to deduce the functions of the frontal brain. We find there disturbances of the memory and perceptibility (*merkfähigkeit*), retrograde amnesia, confabulation, up to complete loss of memory,⁶ as well as disturbances of the conception,

⁶ Also partial loss of memory by focal diseases of the frontal brain may be met with. I have myself published such a case (*Zeitschrift f. d. ges. Neurol. u. Psychiat.*, 13 Bd.), A woman of thirty-seven years, in whom six years previously had begun attacks of spasms attended with unconsciousness

of the association of ideas and intuition, weakmindedness up to idiocy. Mental weakness with deficient reaction upon the external world is manifested in euphoria, hypomania, jesting, childishness (the *puerile mentale* of the French), and buffoonery. To this belongs also the deficient consciousness of illness, as well as of one's own blindness. The disposition and the character change, so that it eventually comes to sensitiveness, irascibility, negatively declining emotions, blunting of moral sense, and of sense of shame, indifference to family affairs, and finally moral insanity. Loss of impulse leads to apathy, indifference, lack of will power, and catalepsy, so that the translation of thoughts into acts is disturbed in spite of the engrams of the single acts being retained, just as in early somnolence. A constrained manner of expression, like compulsory laughter and weeping, are also dependent upon this. And to this also comes motor aphasia in various degrees, likewise amnesic aphasia, agrammatism, etc.⁷

These statements are confirmed by the observations of Chorosko during the war in fifteen cases of lesion of the forehead. In several cases were found anosmia, motor aphasia, deficiency of voluntary speech, continuous flow of words with paraphasia, automatism of speech, difficulty of word-finding, apraxia of ideatoric character, and affective disorders. *Most remarkable is his assertion that in cases of exclusive lesion of the left frontal lobe psychic disturbances had never been observed*—which is contrary to the observations of Ranschburg—but in both-sided lesions only, or in those of the median line (in two or three cases). As typical psychic disorders are assumed by this author to be *weakness of the attention*, manifesting itself in the *decrease of capacity of observation, of the stability and capacity of attention*, as well as in *irrational actions* and in *abnormal conduct generally*.

Goldstein finds also in frontal brain lesions (besides disorders of

and biting of the tongue, forgot the German and especially the French and Serbian languages, which she spoke fluently, though having learned them rather late in life and having made little use of them. There also existed amnesic aphasia, omission of letters in writing, moria, and Jacksonian cramps extending from the right hand and leading to its permanent contracture. The operation on the supposed seat of the disease revealed a glioma, about the size of a small apple, on the left second frontal convolution, which had advanced as far as the middle part of the anterior central convolution and compressed it. During the eleven months of the after-observation there were only seldom attacks of cramp or slight twitching of the right half of the body. The amnesic aphasia has almost entirely disappeared, but the knowledge of the three languages has not returned. The knowledge of her Hungarian mother-tongue has, however, remained unimpaired.

⁷ Hallucinations, as toxic or infectious toxic irritations, take place most probably in the cortex of the respective sense areas.

statics and locomotion, of fixation of the eyes and head, and of keeping the direction), psychic disorders of a subtle kind, which may be fittingly characterized by *lack of capacity to discern the essentials of an event*. From this psychic disturbance arise *inattention, lack of interest and of power of concentration*, symptoms belonging to the domain of *agnostic and apractic disorders*, and lastly *akinesis*. Kleist, however, saw in forehead injuries *hyperkinesis* as well as *akinesis*.

In the frontal brain, that is, the anterior or frontal associative area of Flechsig, are thus deposited the engrams of things and events; there they are compared with each other, consequently apperception goes on; there they are abstracted to ideas, connected to judgments, and the concluding verdicts formed. There the action is weighed and the impulse of the will imparted, and from the sphere of ideas of speech, writing, or music conveyed to the proper centers of motion in the anterior central convolution, where the purely psychological act of the frontal brain is transformed by reversing in movement. It is obvious that the violinist can more exactly execute the bending of his little finger, as to curvature and force, by transmitting the impulse of his will through the subtle fibers to this center, than it could be done by electric stimulation on the part of the experimenter or operating surgeon. The mechanical or electric stimulus is also something quite different from the impulse of the will; whence in my opinion it follows that a tumor pressing upon the central convolution provokes Jacksonian twitchings independently of the will of the patient, or they may be strengthened or weakened by his will, while in *abulia* or *catatonic stupor* the patient remains motionless. Therefore the impulse of the will, as is proved by this exposition, does not arise in the cortex of the central convolution, but in the frontal brain, and only comes here into activity through reversing. It would be more proper, therefore, to speak of the motor cortex area instead of using the misleading designation, "psychomotor center."

It is noteworthy from the summary results of the World War that persons with frontal brain injuries, even after healing of the lesion, show the worst mental effects, unlike the cases of lesions of the central convolution.

Here may also be referred to, the measurements of the head by Bayerthal, whence it is concluded that the size of the anterior part of the head is of importance for the mental faculties, while no connection with the occiput can be recognized. He sees there a proof, missed by certain authors, that the frontal brain plays an important rôle in the intellectual relations.

EXPERIMENTS ON ANIMALS AND COMPARATIVE ANATOMY

Even experiments on animals have not been entirely unsuccessful in elucidating the importance of the frontal lobes for the intelligence.

Franz, of the University of Washington, observed that the extirpation of the left frontal lobe in the ape showed psychic deficiency which was not noticed at the extirpation of the right lobe. Similarly we find this in left-sided frontal brain lesions in man.

Bianchi, wishing to ensure results, extirpated the cortex of both frontal and prefrontal regions, without involving the external, orbital, or cortical areas, although they have the same structure. One-sided extirpation he found generally without effect. His exact observations are very interesting. An ape, operated upon as above described, is a changed being, as compared with his companions: he is lazy, hangs his head, and lies carelessly in a corner. If a sound ape is flung a piece of apple besprinkled with quinine, he seizes it, and after tasting it throws it away and takes up an angry and menacing attitude against the person who deceived him. On the other hand, the operated ape allows himself to be deceived again and again. If you show him an apple and then conceal it in your hand, he will strive to reach it, and if you stretch out your index finger he will not then cease from his futile attempts to get the apple. When, however, a *healthy* ape has been thus cheated once or twice, you cannot deceive him again. Whenever Bianchi threw to the healthy ape red and blue cornets, the red containing sweets and the blue pieces of plaster or fruit dipped in bitter liquid, after the first few attempts the ape had learned to choose the red and ignore the blue. It is otherwise with the *operated* ape: he will run equally after the red or the blue cornets, and after tasting the contents of the blue he remains undecided whether to consume them or reject them; and when finally he throws them away he will immediately gather them up again and throw them away a second time, as if he had already forgotten his first experience. Not only the intelligence but even the disposition is impaired: sympathy for and with his companions has diminished, the sexual instinct has either become brutal or indifference is manifested. Consequently, after mutilation of the frontal brain the ape shows a diminution of the higher psychic functions; of the apperception, because the associations of the rest cannot be compared with each other; and also of the attention and the judgment based thereon.

Franz taught cats and apes certain tricks, and later on, after the extirpation of their frontal brain, he sought to discover whether the animals without their frontal brain were able to perform the tricks

they had previously learned. He locked up the cats in a box, from which escape was only possible by pushing back a bolt. The apes were taught more complicated tricks. These latter had to jump several barriers, to mount a ladder, and finally to open a box in which they found the expected food. Deprived of their frontal brain, they were incapable of performing the tricks they had learned if only a short time had elapsed since the drill; though if a long time had elapsed they could perform the tricks. However, the animals no longer able to perform the tricks could recover the ability by renewed drill. Franz thinks, therefore, that the frontal brain serves for learning and acquiring new associations; while the associations already formed are preserved in other parts of the brain, and for that reason cannot get lost after the exclusion of the frontal brain. To this I would add that, through the relearning of tricks after the removal of the frontal brain, a serious proof is furnished for the vicariation of nerve cells and tracts.

Ceni, by extirpation of parts of the brain, ascertained that the maternal instinct in birds is dependent on the forebrain; in female dogs the entire cortex is of significance in that the feeling component is chiefly connected with the frontal lobe and the sensory component to the occipital lobe.

Like all the higher feelings, the maternal instinct may also be placed in the frontal pole. Thereby it may be emphasized that Ceni separates in a remarkable manner the maternal instinct from sexuality and erotism, and finds it also independent of endocrine activity.

In his most important investigations into the comparative histological localization of the cortex of the cerebrum, Brodmann demonstrates that an exact localization of the cortex is possible only by means of the examination of its microscopical layer structure. According to this investigator, the frontal lobe, in the sense of the ancient teaching, is divisible into a precentral region (corresponding to our anterior central convolution) representing the center of the arbitrary movements, and in a frontal region whose function, in his opinion, is up to the present unknown. This precentral region is not missing in any mammal and its extent in the animal kingdom varies only within narrow limits. On the other hand, the frontal region is very inconstant, being present only in the more highly organized animals as a special structural formation. In the anthropoids it is most strongly developed. The surface of the frontal region amounts, in man, to 29 per cent of the whole brain surface; in the chimpanzee, to 16.9 per cent; in the gibbon, to 11.3 per cent; in two baboons, to

10.1 per cent and 9.5 per cent, respectively; in the cebus capucinus, to 9.2 per cent; in the lemur (or maki), 8.3 per cent; in the dog, 6.9 per cent; in the cat, 3.4 per cent; and in the rabbit, 2.2 per cent. The limiting of the analogous areas was here founded on the same cytoarchitecture.⁸

On the basis of his myelogenic findings, Flechsig considers erroneous Monakow's view that the ungulata possess relatively as large a frontal brain as man. Flechsig finds the frontal terminal area in anthropoids also much smaller than in man.

From these investigations in comparative anatomy it clearly follows that the frontal brain does not—as some authors pretend—preside especially over the equilibrium functions and the central innervation of the muscles of the trunk, besides the expressive speech. For the claim to retention of the equilibrium in all erect-standing anthropoids, as well as in apes agilely moving about in the trees, is not less, and the muscles of the neck of mammals with large heads and horns are more powerful than in man. As regards the muscles of the neck, it has already been pointed out that their centers are authenticated in the anterior central convolutions.

Concluding Remarks

A review of this field, which should have taken into consideration the results of comparative anatomy, anthropology, and experiments, as well as the teachings of every-day life, without reckoning the clinical observations, would also have maintained the mental significance of the frontal brain. Certainly we shall not have spoken here in favor of the exclusive, but only of the prevailing psychic significance of the frontal brain; therefore we do not deny the importance of the other associate areas, like the parietal, temporal, and island areas of Flechsig. Nevertheless the seat of the highest mental activity is in the frontal brain.

If in frontal brain diseases mental changes are sometimes missed,

⁸ Professor Lenhossék, to whom I applied for data on comparative anatomy of the brain, was so exceedingly obliging in the matter that I would like here to express my indebtedness to him. On that occasion he wrote to me as follows: "It is indeed difficult to understand how the psychic importance of the frontal brain can be doubted. To me it is a *conclusive proof* of still greater weight than the comparative and physio-pathological arguments, the subjective feeling which accompanies the mental activity, which—at least in me—points to the frontal part of the brain, and also here to the lower region lying over the eyes. I feel certain that *here* lives and works my individuality, and *not* in the occipital lobe or elsewhere. By hard, strenuous thinking, one gets a pain in the frontal region. Why is that? We see the gradual development of the forehead in the animal kingdom up to man, and in the human race from the Neanderthal man through the lower races of mankind up to the white man."

the cause thereof is that frontal brain tumors—if not large, or if of slow growth—are not perceptible during the lifetime of the patient, or else the examination was insufficient or inadequately performed, and no inquiry had been made among his relations and friends which might have revealed the more subtle individual and character changes. It is here the question of a patient afflicted with loss of interest and intuition, lack of energy, apathy, difficulty of adaptation to the new circumstances of life, incapacity to learn anything new, moral obtuseness, and consequently changes only slightly or not at all accessible to intelligence tests. *But from whatever cause the negative result may have arisen, it cannot by any means be deduced therefrom that the frontal brain possesses only slight psychic significance or none at all.*

Of course, with all the information given concerning the workshops of the individual mental functions, of the tracts on which the stimulations ebb and flow, nothing has been said with regard to their essence. Feeling and consciousness, attention, perception, and comparison, abstraction, idea and volition—all these are still to us as the Veil of Isis, though the same may also be said of other spheres—above all, of the fundamental problem of matter. Here may be applied the words of Holy Scripture: “Secret things belong to the Lord our God, but what has been revealed belong to us and to our children for ever.” To the human mind is left everything that is accessible, and God-likeness is attributed to man in his intellectual superiority: “Ye shall be as gods, knowing good and evil.”

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ORGANIC EPILEPSY CONSIDERED FROM THE STAND- POINT OF CEREBRAL LOCALIZATIONS *

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The pathology of organic epilepsy in spite of numerous post-mortem records still presents a wide diversity of opinion. In Marshall Hall's well known medullary origin of epilepsy the stimulation is supposed to come first from the bulbar centers and a stasis of cerebral circulation follows. Fritsch and Hitzig¹ have shown experimentally that convulsive seizures are the result of stimulation only of certain cortical areas. Meynert places the original disorder in the cornu ammonis. Chaslin and Bleuler consider epilepsy as a gliosis of the cortex. Southard observed in epilepsy a superficial cortical gliosis, lesions of the uncus, of hippocampal and temporal gyri; Bevan Lewis, Clark and Prout speak of degeneration of cells in the second cortical layer. Lesions of the meninges and the calcarium are also apt to produce epileptic convulsions.

H. Jackson considers epilepsy as a three level affection. In the lowest level epilepsy is caused by an involvement of the upper spinal system, medulla, pons and cerebellum. In the middle level type the cortical motor and sensory area, also the corpora striata, are the direct cause of epilepsy. In the superior level epilepsy the lesion lies in the prefrontal lobe. Jackson's conception, therefore, shows a great variety of localizations as the origin of convulsions.

For a still fuller appreciation of the problem of localization in organic epilepsy it is well to mention the case of Gowers² in which an epileptic suddenly had an attack of apoplexy with hemiplegia, and the convulsions disappeared on the paralyzed side; also the case of Prus,³ in which a painting of the motor cortex with cocaine prevented convulsions. On the other hand pathological conditions in areas far removed from the motor cortex have been known to produce epileptic convulsions. Ferrier⁴ in Part VI of his book says: "I have found

* Read at the meeting of the American Neurological Association held in Philadelphia, June 5-7, 1924.

¹ *Arch. f. Anat. u. Phys.*, 1870.

² *Epilepsy and Other Chronic Disorders*. London, 1881.

³ *Wiener klinische Wochenschrift*, 38, 1898.

⁴ *Functions of the Brain*, 1886.

that electrical stimulation applied to the surface of the ventricular nucleus of the corpus striatum in animals causes a condition of pleurosthotonus, or general muscular contraction on the opposite side of the body. The head is drawn strongly to the side; the facial muscles are thrown into spasmodic contractions and the limbs are rigid in the position of equilibrium between the flexors and extensors, the flexors predominating. There is no differentiation of movement from any point of the ventricular aspect of the ganglion, all the actions differentiated in the cortical centers being simultaneously called into play." Ferrier's results had been corroborated by experiments of Corville and Duret.

Ventricular surfaces are covered by ependymal lining membranes consisting of columnar and ciliated epithelium. In the ventricular cavity, in a state of suspension, lie the choroid plexuses with their villi which are constantly brought into contact with the ependyma. Should the latter be abnormally disturbed, the villous processes will produce an irritation of the brain through the process of diffusion of stimulus to the cortex along association fibers, and epileptic convulsions will ensue. Fischbein⁵ reported cases of ventricular epilepsy. In the writer's case,⁶ the lesion was confined to the anterior cornua of the lateral ventricles, more in the right than in the left. The entire surface of the right cornu was covered with miliary nodules thickly crowded. This was the only material lesion in the brain (as proved histologically).

An ependymitis has the same reaction as the above mentioned gliosis or sclerosis of the cornu ammonis, or other lesions in the brain which have been found in cases of organic epilepsy.

Luce⁷ speaks of convulsions in pontine hemorrhages and he considers the pons as possessing epileptogenous properties. In this contention Nothnagel⁸ concurs: he considers that in the pons and medulla special convulsive centers are located. Pollock⁹ from his experimental observations concludes that the reticular formation extending from below the thalami to the spinal cord possesses epileptogenous qualities.

It is therefore evident that a lesion of any portion of the brain may be accompanied by epileptic seizures and therefore may be considered as an epileptogenous zone. Stimulating surfaces may be localized in any segment, but the reception of the stimuli and the

⁵ Proceedings of the Association for the Study of Epilepsy, 1914.

⁶ *New York Med. Journal*, Nov. 25, 1916.

⁷ *Deutsche Ztschr. f. Nervenhe.*, 15, 327, 1899.

⁸ *Virchow's Archiv.*, 44, 1, 1868.

⁹ *Am. Arch. of Neur. and Psychiatry*, May, 1923, p. 604.

discharge of motor power are the province of the motor cells of the cortex. Therein lies the main station to which flow the abnormal nervous currents originating from any irritated source in the brain. Association fibers, commissural and projective tracts connect the motor cortex with other regions of the cortex, also with the subcortical and medullary centers. Experimental physiology has shown that *via* the ascending frontal convolution the totality of the cortex acts on the subcortical and medullary centers. The ascending frontal is not only the place of the corticofugal pathways, but it equally receives projection fibers of corticopetal character, which guide it in its functions, especially in the production of isolated movements and reflexes.

These latter fibers transmit and carry to the motor cortex stimuli from a great variety of sources. Of course they reach the cortical motor area after running through a complex tract and after many interruptions, but they gather together with other centripetal fibers in the thalamus opticus. In the corticopetal pathways one sees an apparatus necessary for cortical irritation, and especially the ascending frontal convolution which by means of corticofugal tracts, *viz.*, corticospinal, corticomesencephalic and others brings in a specific element for movements among other functions. As a corroboration of this contention we find in the observations, for example, of Gowers in which an epileptic, after a sudden attack of apoplexy with hemiplegia, had no more convulsions on the paralyzed side. After an experimental ablation of the ascending frontal convolution, Minkowski¹⁰ and others observed disturbances of locomotion, loss of isolated movements, diminution of resistance to passive displacement of the paralyzed limbs and loss of ability to correct defective attitudes given the limbs.

A brief survey of the anatomical arrangement of connecting pathways will be helpful for a better understanding of the great variety in localization of the irritative lesion in organic epilepsy. The white substance of the cerebral cortex contains ramifications of nerve fibers originating from various regions of the central nervous system and form systems of fibers, chiefly: (a) Association fibers, commissural and projection fibers.

Association fibers (short and long): The short fibers connect two neighboring convolutions. The long fibers constitute the cingulum, the superior and inferior longitudinal bundles, the uncinate bundle and the occipito-frontal fasciculus. The cingulum connects

¹⁰ See also *Schweizer Archiv für Neurologie und Psychiatrie*, 1917, 1, p. 389.

the first limbic convolution with the second, also with lobes of the dorsomesial surface of the hemisphere and the olfactory region of the base of the brain. The superior longitudinal bundle connects the frontal lobe with the parietal and temporal lobes. The inferior longitudinal fasciculus connects the temporal lobes with the occipital lobe. The uncinate fasciculus connects the apices of the temporal and occipital lobes. The occipito-temporal bundle brings together the occipito-temporal and frontal portions of the cerebrum.

An experimental ablation of the ascending frontal convolution produces a secondary reduction of the white substance of the ascending parietal, of the superior and inferior parietal lobules, also of the apex of the frontal lobe. A destruction of any of the latter parts produced a reverse secondary degeneration.

According to Cajal, the association fibers, by virtue of their direction and of the character of termination of their branches, serve to communicate between a cell in any well-defined part of the cortex with many cells of parts more or less remote of the same or of the opposite hemisphere. The largest majority of the association fibers send out also collaterals along their course and thus are brought into still greater contact with different layers of cerebral cortex.

The commissural fibers originate over the entire surface of the cortex of one hemisphere and terminate in the cortex of the opposite hemisphere. They contain the corpus callosum, anterior commissure, the transverse fibers of the fornix and commissural fasciculus of the cornu Ammonis. In their pathway from one hemisphere towards the other, the callosal fibers send off fine collateral branches which end in the cortex of either hemisphere. Cajal has shown that the callosal fibers are, properly speaking, a interhemispheric system of association fibers connecting symmetrical and asymmetrical areas of the bilateral cortex.

Experimental investigations show that a lesion of the motor area leads to a massive degeneration of the callosal fibers which extends to and into the corona radiata of the opposite hemisphere. In this manner, it has been shown that the ascending frontal convolution is connected with the ascending parietal of either hemisphere, that the subcallosal layer of one side is connected with the corpus callosum and internal capsule, also with the caudate nucleus of the other side. The same layer forms a part of the fronto-occipital fasciculus of the association fibers. Pursuing further the effect of an experimental lesion of the ascending frontal convolution, one finds that the striatum, the pallidum in particular, the putamen, the internal

capsule, the thalamus with its various nuclei and their radiations—all suffer secondarily.

In the striatum has been observed a degeneration of the fibers originating in the cortex (cortico-caudate), *viz.*, fibers coming from the ascending frontal convolution or from the adjacent portions and terminating through the head of the caudate nucleus in the lenticulo-caudate segment of the internal capsule. The same was seen by Long and Dejerine in the fibers connecting the cortex with the globus pallidus, and *vice versa*: a degeneration of the fibers going from the striatum to the cortex in cases of a primary degeneration of the former.

In the case of the internal capsule, alterations of its anterior segment or lenticulo-caudate was seen in ablation of the ascending frontal cortex, and *vice versa*.

In similar experiments secondary degeneration has been observed in the thalamus. According to Dejerine the pulvinar in its lower portion receives the temporo-thalamic bundle which originates in the temporo-occipital lobe. All other thalamic nuclei similarly contain projection fibers coming from the frontal cortex, a lesion of which will give place to a degenerative state in either direction.

Among the causes which are about to be described there are examples of cerebellar involvement which give place to convulsive phenomena. In order to understand such occurrences it is necessary to recall the existence of fronto-cerebellar pathways and their anatomical localization. Mingazzini, Flechsig, von Monakow admit, that the fronto-cerebellar pathways run through the anterior segment of the internal capsule of which they constitute about one-half; then they descend and after forming one-fifth of the foot of the cerebral peduncle, they surround the antero- and retro-pyramidal groups of fibers, cross at the level of the posterior extremity of the pons and enter the middle cerebellar peduncle on the opposite side. A lesion, therefore, of one end of these chains of neurones suppressing or disturbing their activity will at the same time interfere with the function of the fibers emanating from the lesion and will thereby carry its morbid influence to the subjacent nuclei and through them to the other end of the pathway. Literature is abundant with examples of a pathological interrelation between the cerebellum and the frontal region of the cerebrum. Cruveilhier, Charcot, Turner, Mott, Tredgold, Thomas, Cornelius, von Monakow, Mingazzini, and Kononova reported striking examples. More recently Fragnito,¹¹ and

¹¹ *Policlinico* (sez. medico), XXI, f. 6, p. 245, 1914.

F. Tilney¹² reported very illustrative anatomoclinical cases to corroborate the contention of the older writers.

Description of Cases. Since the chief feature of the present work is to bring forward anatomoclinical data concerning various cerebral localizations in organic epilepsy, the detailed description of various symptoms will be omitted.

Case I. A. C., male, forty-two years of age, developed convulsive seizures six months before death. Some of them were confined to the right arm and leg and some would commence on that side and gradually become generalized. They became very frequent in the last two weeks. He was found dead in the morning after one of the attacks which was very violent. At autopsy an extensive softening was found in the area embracing the basal ganglia and surrounding white matter extending in front to the end of anterior horn of the lateral ventricle and compressing the motor cortex.

Comment. The considerable reduction of the subcortical tissue corresponding to the motor area was evidently the irritating zone.

Case II. Mrs. A. G., female, forty-five, colored, presents during the last two years of her life a gradually increasing obesity, glucose in the urine, and a lethargic state, finally convulsive seizures of a generalized character. At autopsy a small tumor was found at the base of the brain in the pituitary gland.

Comment. Since no other lesion was found in the brain, macro- and microscopically, the logical presumption is that the dyspituitarism from which the patient was suffering was the direct cause of the epileptic condition. Global compression of the brain, edematous states, or else pathological elements, thrown into the circulation from the abnormal pituitary, may be invoked here. It must be mentioned that the brain at autopsy was found edematous.

Case III. R. T., male, twenty-three years of age, presented general symptoms of intracranial hypertension and focal epilepsy, confined to the left side of the body, also mental dullness with impairment of memory. At autopsy two cystic cavities were found in the right frontal lobe, reducing considerably the subcortical tissue in the same area and flattening the cortex itself.

Comment. The epilepsy was here due to direct pressure and secondary irritation of the motor cortical area.

Case IV. C. D., male, forty-seven years of age, presented during the last two years of his life intermittent attacks of sudden paresthetic disturbances in the right arm and right side of the face. He soon noticed that the attacks would be followed by clonic muscular contractions rapidly following one another in the same area, and lasting several seconds. The premonitory sensory disturbances soon dis-

¹² J. OF NERV. AND MENT. DIS., c. 47, No. 4, October, 1917.

appeared and became substituted completely by the above motor phenomena. In one of these seizures, which was then bilateral, he lost consciousness. He became a right hemiplegic and three days later expired. Autopsy revealed softening in the central portions of both hemispheres, more in the left than in the right.

Comment. The reduction of the subcortical tissue and its gradual destruction were a sufficient material cause of an irritative state of the motor cortex and therefore of epileptic convulsions.



Case 2. Tumor of the Pituitary Gland.

Case V. K. O., female, thirty-two years of age, fell accidentally from a second-story window down on soft ground. There was no fracture of the skull, but she was unconscious for the next twelve

hours. One hour after consciousness had returned she commenced to complain of severe headache, and she vomited abundantly. On the twenty-fourth hour after the trauma she had a convulsive seizure in the left arm and leg, with preservation of consciousness. Since then she had several attacks. Operation revealed only what appeared upon the touch of the finger, a slightly softened area over the entire frontal region in the right hemisphere. The surgeon closed the wound. Patient expired on the next day. Autopsy revealed a large hemorrhage beneath in the subcortical layer of the softened area.

Comment. The focal epilepsy was evidently due to the compression and irritation of the frontal cortex.

Case VI. A. G., male, thirty-five years old, house painter for twenty years, has had a number of attacks of abdominal colic, severe cephalalgia, blue line on the gums. Two weeks before death he developed epileptiform seizures confined to the left leg. They occurred several times a day; sometimes there was loss of consciousness and sometimes not. At autopsy a softened area was found in the close vicinity of the right paracentral lobule.

Comment. Pressure and irritation of the leg center by the diseased area was the direct cause of the focal epilepsy.

Case VII. J. O'B., male, fifty-seven years of age, while trying to lift an extremely heavy bar of iron, fell unconscious. He remained comatose twenty-four hours. At the end of that time he complained of severe headache and dimness of vision. Rapidly he developed convulsive seizures at first of a generalized localization, but later they became confined to the left arm and leg. The condition lasted ten days. At autopsy a large hemorrhage was found in the left occipital lobe.

Comment. The only logical explanation of the organic epilepsy can be found in the enormous pressure transmitted to the motor area by the very large hemorrhagic focus, or in the irritation of the interrupted fronto-occipital fasciculus, or else in the combination of both pathological conditions.

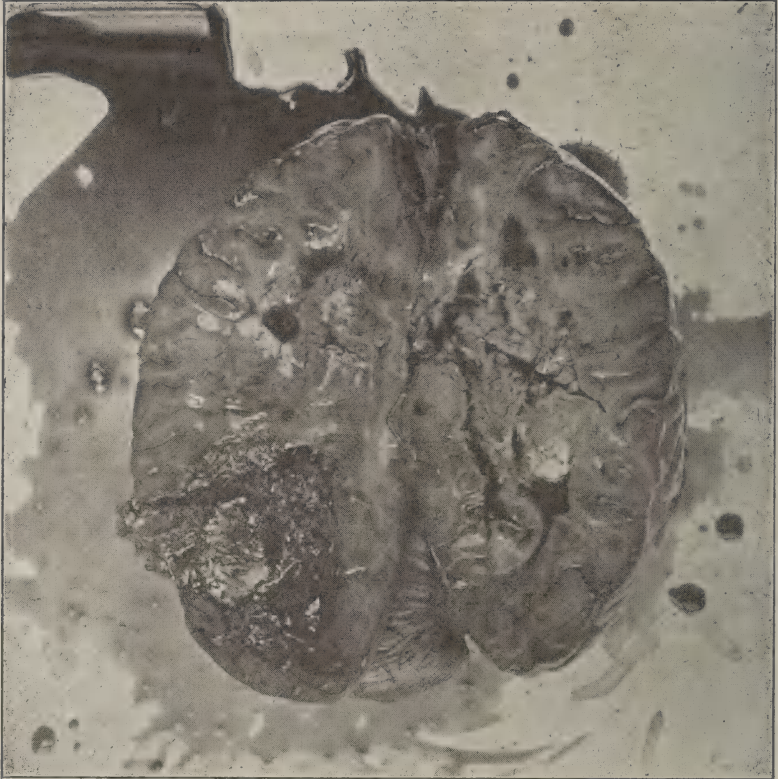
Case VIII. M. S., girl of eighteen, presented the typical picture of leukemia. Six weeks before death multiple hemorrhages occurred, viz., from the mouth, rectum, nose, and stomach. She developed convulsive seizures of bilateral localization. They occurred up to the time of death once or twice a day. At autopsy unusually extensive softening was found in the subcortical tissue of both hemispheres from the frontal to the occipital poles.

Comment. The considerable reduction of the motor cortex, because of the underlying softening, was a sufficient cause of its irritation and production of convulsions.

Case IX. S. T., male of twenty-seven, presented among cerebellar manifestations also convulsive seizures of a generalized character, occurring once or twice a week since the cerebellar picture set in, viz., one year before death. At autopsy was found a soft mass pressing

against the lower surface of the anterior portion of the median lobe and laterally against the anterior portions of both cerebellar hemispheres.

Comment. As it was indicated in the text, irritation of the fronto-cerebellar pathway is the only explanation of convulsions in cerebellar pathological conditions.

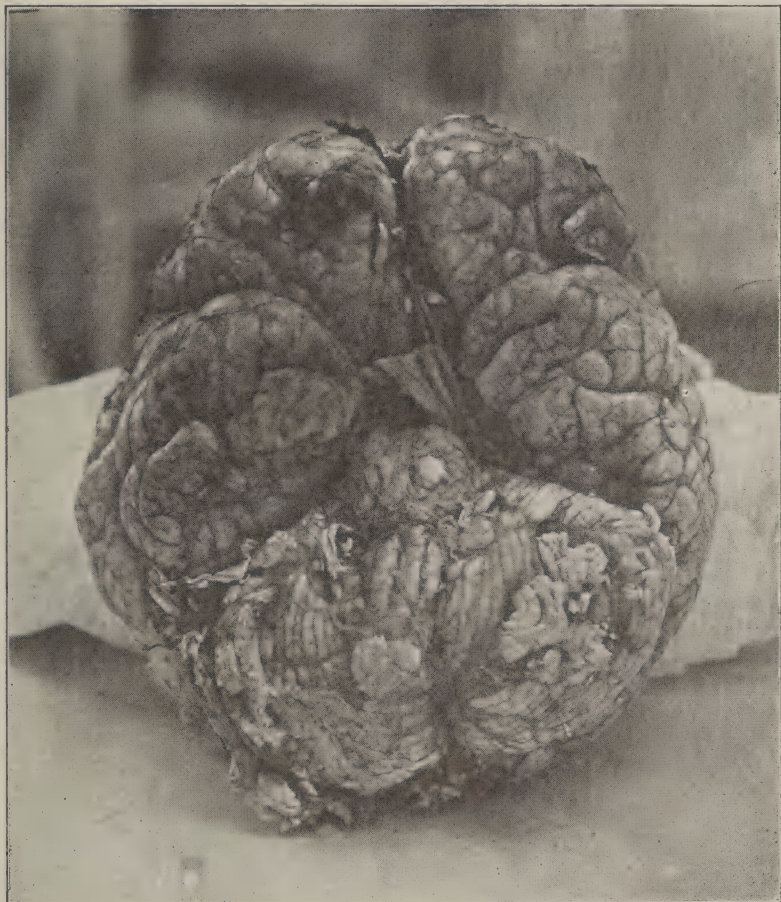


Case 7. Hemorrhage of the Left Occipital Lobe.

Case X. X. Z., male, fifty-seven years of age, with arteriosclerosis, suddenly, during coitus, became vertiginous and lost consciousness. On the next morning his left arm was found completely paralyzed and the leg paretic. Twenty-four hours later he developed convulsive seizures in the left arm and face, which since then occurred almost daily, and which sometimes were accompanied by loss of consciousness. Patient lived four months, and he died in one of the epileptic seizures. Post-mortem revealed a hemorrhage and softening in the subcortical tissue in the right hemisphere beneath the sensory-motor area.

Comment. The pressure reduction of substance underlying the motor region accounts for the focal epilepsy.

Case XI. K. O., female, fifty-four years of age, with a blood pressure of 210 (systolic), suddenly became dizzy and lost consciousness. Ten hours later she regained consciousness. Thereafter she became depressed and lost all interest in surroundings. Her memory became defective. On the third day of her illness she noticed sudden



Case 11. Thrombophlebitis with Surrounding Softening of the Under Surface of the Right Frontal Lobe.

paresthetic disturbances in her left arm and face, which would last but a few seconds. Each attack would leave the arm in a paretic state. Soon the paresthesiae began to be followed by muscular twitchings in the same arm, and ten days later the patient developed typical convulsive seizures in the left arm and face but without loss of consciousness. The patient died in an attack of lobar pneumonia.

Autopsy revealed a thrombophlebitis with surrounding softening in the anterior portion of the frontal lobe.

Comment. The close proximity of the pathological focus to the motor region explains the focal epilepsy.

Case XII. A. C., female, twenty-four years of age, in the midst of good health, developed meningeal symptoms with convulsive attacks, at first of a generalized character. Later, in the third week of her illness, the seizures would invariably commence in the left leg and rapidly ascend to the arm and face on the same side. The patient lived six weeks. Autopsy revealed a purulent meningitis, especially over the right cortex (pneumococcus).

Comment. The preponderance of purulent covering over the right hemisphere accounts for the excess of convulsive attacks in the left side of the body.

Case XIII. J. L., male, twenty-seven years old, developed suddenly earache on the right side. Soon purulent discharge appeared. The temperature went up to 104.3° F., he became restless, slightly delirious, and on the sixth day of his illness he was seized with convulsive seizures in all four extremities. In the first few days, the latter occurred daily two or three times. Later the spasms became limited to the left leg and arm. He died on the twentieth day of his illness presenting cerebellar symptoms suggesting a right sided lesion presumably an abscess. Autopsy revealed an abscess in the right cerebellar hemisphere, destroying fully one-half of it. The entire base of the brain showed submeningeal pus, but the upper cortical surface showed no meningeal involvement.

Comment. Since the convulsive seizures coincide with the appearance of cerebellar symptoms, it is to be presumed that the fronto-cerebellar pathway was the source of the epileptic disorder. However, the latter may have been the result of the septicemic condition.

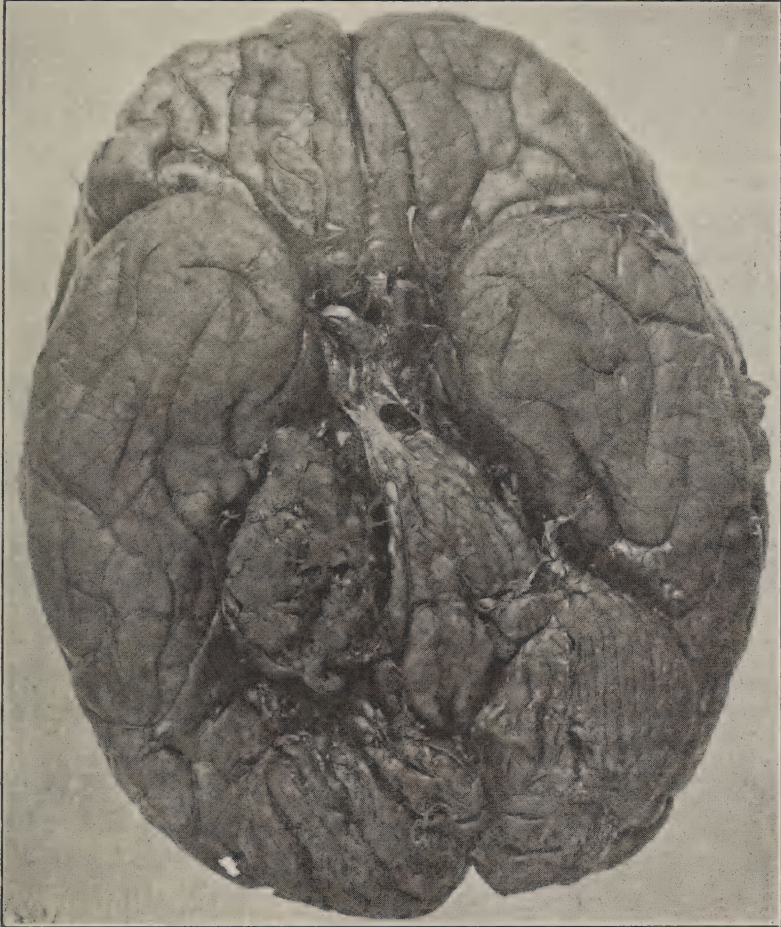
Case XIV. K. P., female, thirty-nine years of age, presented symptoms suggesting pontocerebellar involvement on the right side and gave a history of convulsive seizures dating from the time the former made its appearance, namely, six months before death. The fits were all accompanied by a loss of consciousness, and were at times of a generalized character and at times confined to the left arm and leg. Autopsy revealed a small hard tumor in the right pontocerebellar angle.

Comment. Since the mass invaded also the anterior portion of the right hemisphere, the presumption is that fronto-cerebellar pathway was the cause of the convulsive seizures.

Case XV. J. S., male, house painter, forty-seven years of age, had several attacks of saturnine encephalopathy. Four months before he died he had an apoplectic insult with loss of consciousness. His left arm and leg were paralyzed. On the next day he developed convulsive seizures on the paralyzed side. The hemiplegia gradually improved, but the unilateral convulsions continued, although they

occurred at long intervals, one in two or three weeks. He contracted influenza, developed profuse diarrhea, became comatose, and died. Autopsy revealed a hemorrhage in the subcortical tissue midway in the right hemisphere, also softening in front of it.

Comment. The focal epilepsy was probably due to a lesion of the pathway running to the frontal region and to pressure and irritation at a distance of the motor area.



Case 17. Large Neoplasm in the Right Ponto-Cerebellar Angle.

Case XVI. F. O'B., female, forty-two years of age, presented symptoms of involvement of the cerebellum, presumably on the right side. Six weeks before death, convulsions appeared on the right side, and since then occurred only five times, three times with loss of consciousness and twice without. From the last attack patient never recovered, and expired. Autopsy revealed a small tumor in the

anterior portion of the right cerebellar hemisphere lying close to the pons.

Comment. The focal epilepsy was probably due to the irritation of the fronto-cerebellar pathway.

Case XVII. L. M., male, thirty-seven years of age, began to show symptoms of ponto-cerebellar involvement on the right side one year before he died. During the first six months of his malady he had two convulsive seizures on the right side, but later the attacks occurred more frequently. There was loss of consciousness in each attack. Autopsy revealed a large neoplasm in the right ponto-cerebellar angle.

Comment. The pressure and subsequent disfigurement of the entire brain, also destruction of the tissue close to the tumor, are sufficient causes for the localized convulsive attacks.

Case XVIII. T. S., male, twenty-five years of age, showed cerebellar symptoms on the right side and, during the last three weeks of his life, he had four convulsive seizures, all confined to the left arm and leg, with loss of consciousness. Autopsy revealed a large cystic mass in the right cerebellar hemisphere pressing forward against the pons.

Comment. The displacement of the parts close to the tumor and their destruction may account for the focal epilepsy.

Case XIX. Q. Q., male, fifty years old, presented symptoms of involvement of the right cerebellum during a period of nine months. He also had several convulsive seizures in the last four months of his life. They were at times generalized and at times confined to the right side. Autopsy revealed a tumor in the right cerebellar hemisphere extending into the pontine angle.

Comment. Pressure upon and destruction of the surrounding tissue are sufficient factors to explain the epileptic condition.

Case XX. S. L., male, fifty-nine years of age, presented during many months severe headache with mental hebetude. He was suddenly seized with an attack of vertigo and fell into a coma. For four days he remained in the same state and very frequently was seized with convulsive attacks either on one or on the other side, and sometimes on both sides. Autopsy revealed a hemorrhage in both lateral ventricles.

Comment. The pressure exercised by the extensive hemorrhagic foci produced irritation of the subcortical tissue of the motor area.

Case XXI. D. O'B., male, fifty-three years of age, had a number of attacks of sudden paresthesia in the right arm and leg. Soon this sensory disorder was followed by a motor disturbance, consisting of muscular twitches sudden in onset and termination, a slight mental cloudiness, also a sense of exhaustion lasting about an hour after each attack. Ten days before death he developed a sudden hemiplegia following a more severe attack of the above motor phenomena.

Autopsy revealed a considerable destruction of the left ventricular zone in its anterior portion.

Comment. Pressure and irritation of the subcortical tissue in the close vicinity of the frontal region may account for the localized convulsions.

Case XXII. Ch. T., male, forty-two years of age, was subject to attacks of twitching in the left arm, with loss of consciousness. In the intervals the arm showed a tremor upon voluntary movements. Astereognosis in the same limb was evident. The convulsions became very frequent and in one of them the patient died. Autopsy revealed an endymenitis in the anterior horn of the right lateral ventricle. Thickening and numberless miliary nodules, also cellular infiltration, were present.

Comment. Ventricular lesions as the only pathological localization have been reported in some cases of Jacksonian epilepsy (see text).



Case 22. Ependymitis of the Anterior Cornu of Lateral Ventricle.

Case XXIII. L. N., female, twenty-three years of age, suffering from an endocarditis, developed suddenly a left hemiplegia without loss of consciousness. On the following day convulsions appeared on the paralyzed side. Since then they occurred intermittently and always limited to the affected side. She died suddenly. Autopsy revealed a softening in the right internal capsule and surrounding nuclei.

Comment. Irritation and reduction of the subcortical tissue may account for the focal epilepsy.

Case XXIV. N. K., male, forty-nine years of age, suffered an apoplectic insult followed by a left hemiplegia. One week later convulsions appeared on the paralyzed side and they occurred at various intervals. Four weeks before death they ceased, but suddenly reappeared with great violence, and the patient expired. Autopsy showed a total softening of the entire left internal capsule and the contiguous portions of the ganglia.

Comment. Destruction of the neighboring subcortical tissue and a pathological reduction of its size may account for the focal epilepsv.

Case XXV. W. C., male, thirty-nine years of age, presented, eight months before he died, a mild right paresis, word-blindness, and partial word-deafness, also a stereognosis in the right arm. Six weeks before death, he commenced to have convulsive attacks in the right leg which soon extended also to the arm. He expired in one of the attacks. Autopsy showed a glioma involving the left supramarginal



Case 25. Glioma Involving the Left Supramarginal Gyrus, Angular Gyrus, and Posterior Two-thirds of the Temporal Convolution.

gyrus, angular gyrus, and posterior two-thirds of the temporal convolution.

Comment. The close proximity of the lesion to the motor area explains the focal epilepsy.

Case XXVI. J. B., male, fifty-six years old, a house painter for forty years, presented at different intervals attacks of saturnine encephalopathy. For several days he complained of violent headache

and suddenly was seized with an apoplectic attack. While unconscious he had convulsions in the right arm and leg. The spasms occurred many times during the following few days. The patient never recovered and expired on the sixth day. Autopsy revealed a hemorrhage in the right lateral ventricle and a marked deviation of the opposite half of the brain.

Comment. The considerable pressure of the normal side produced by the extensive hemorrhagic focus may explain the focal epilepsy.

Case XXVII. T. Q., female, forty-nine, during convalescence from a prolonged course of typhoid fever, suddenly fell unconscious. A few hours later, while in coma, she commenced to have convulsive seizures on the right side of the body affecting the arm and leg. She did not regain consciousness and died on the fourth day while having the convulsions. Autopsy revealed ventricular hemorrhages on both sides, more on the right than on the left.

Comment. Destruction of tissue and considerable pressure towards the cortex may explain the focal epilepsy.

Case XXVIII. L. M., female, twenty-two years of age, suffered for many years from marked headache. Her head was very large. Kyphosis and scoliosis were marked. The left side was paretic and the patient very often had convulsive seizures on the same side. Autopsy revealed an extraordinary dilatation of both lateral ventricles and of the central canal of the cord.

Comment. Considerable destruction of the tissue surrounding the ventricle explains the convulsive seizures.

Case XXIX. P. O., male, thirty-nine years of age, presented all the general symptoms of increased intracranial pressure and convulsive seizures in the right face and arm. Autopsy revealed a tumor wedged in between the frontal and temporal lobes.

Comment. The localization of the mass is sufficient to explain the focal epilepsy.

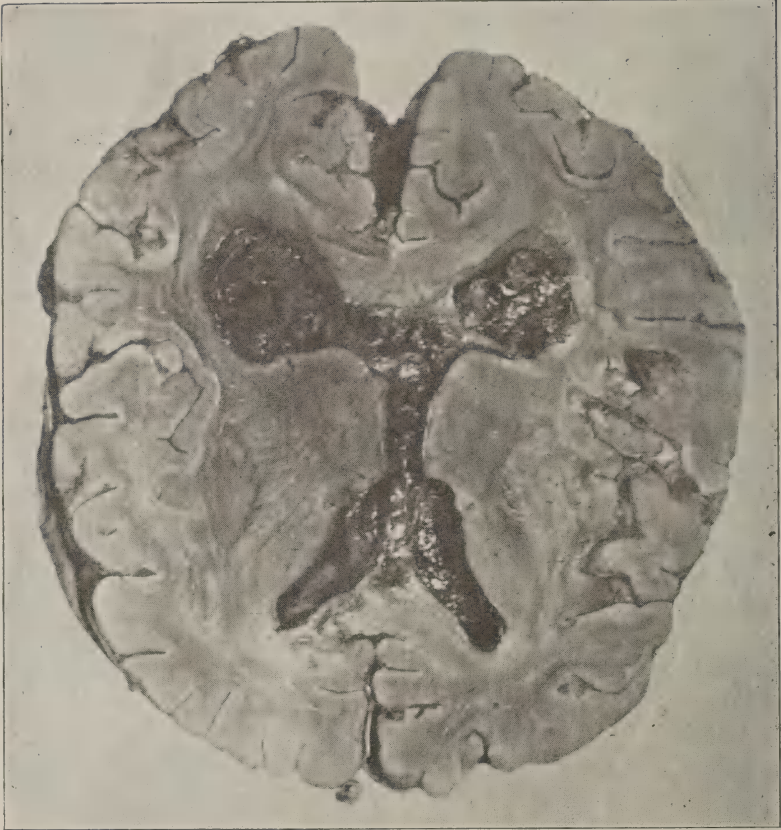
Case XXX. P. O., male, thirty-eight years of age, sustained a violent cranial trauma, without fracture of the skull. He was unconscious for several days. He lived three weeks, during which he presented a right hemiplegia and convulsive seizures on the same side. The latter occurred every three or four days, and during the last three days several times on the same day. Autopsy revealed a dilatation of the left lateral ventricle, distortion of the corpus striatum and corpus callosum, finally flattening of the left hemisphere.

Comment. The pressure towards the left frontal cortex and destruction of subcortical tissue explain the focal epilepsy.

Case XXXI. A. J., female, thirty-two years of age, tubercular, anemic, emaciated, became somnolent and rapidly entered into a state of coma. On the next day she regained consciousness, but was some-

what stuporous. While in this condition convulsive seizures were observed in the left arm and leg. Patient lived seven days, during which time the convulsive attacks occurred very frequently. At autopsy an extensive hemorrhage was seen over the right frontal lobe encroaching on the Rolandic area.

Comment. The seat of the cortical pressure is sufficient to explain the localization of the convulsions.



Case 28 Extraordinary Dilatation of Both Lateral Ventricles.

Case XXXII. K. J., male, thirty-four years of age, presented symptoms suggesting an involvement of the right cerebello-pontine angle. During the last three months he developed convulsive seizures confined to the right arm and leg. Autopsy verified fully the ante-mortem diagnosis.

Comment. The involvement of the fronto-cerebellar pathway may probably explain the focal epilepsy.

Case XXXIII. J. D., male, forty-two years old, suddenly had an apoplectic seizure with loss of consciousness. A few hours later he recovered but found himself paretic on the right side. In the evening of the same day he was seized with convulsions on the same side. Since then he had a large number of convulsive attacks, all on the affected side. He died six weeks later. Autopsy showed a hemorrhage in the subcortical frontal tissue, reducing the cortex to a thin layer.

Comment. The lesion and the destruction of the surrounding tissue fully explain the localization of the focal epilepsy.

To sum up the thirty-three organic cases in which focal epilepsy occurred we find a wide variety of lesions, namely:

Hemorrhage in the subcortical frontal tissue; softening more or less extensive in the basal ganglia and internal capsule; ventricular hemorrhages; hemorrhage in occipital lobe; tumors in cerebellar hemispheres; tumors in the cerebello-pontile angle; tumor of the pituitary gland; dilatation of the lateral ventricles; ependymitis; thrombophlebitis in the orbital lobe; purulent meningitis.

It was mentioned on the first pages that only one phase of the problem of organic epilepsy is being considered here, namely, the seat of the convulsive seizures and the localization of the lesion. As to the former, in every one of the cases the character of the seizures was that of typical Jacksonian epilepsy. The lesions were all gross and their localization was multiple, but not strictly confined to the motor area. These clinico-anatomical findings are in entire accord with those of the experimental investigators such as Pollock, Holmes,¹³ and others. The latter also believe that convulsions may occur from irritation not only of the motor cortex, but also of subcortical centers, medulla and pons. The latter contention finds its corroboration in the production of convulsions by medullar convulsants in decerebrated animals and in cases of anencephalus, also in the persistence of epileptic convulsions following decortization. Luce¹⁴ also speaks of convulsions in pontine hemorrhage. The cerebellum, as some of my cases as well as the above mentioned experiments show, may be the point of departure of convulsive seizures. The same may be said of ventricular irritation in the absence of any other lesion, of tumors at the base, such as in the pituitary case of my series. If we also consider many other lesions in various portions of the cerebrum, between its anterior and posterior poles, at its base, over its vertex, in its interior, we are justified in the position that

¹³ *Archives of Internal Medicine*, 1915, Vol. XVI, p. 213.

¹⁴ *Deutsch. Ztschr. f. Nervenheilk.*, XV, 1899, p. 327.

epilepsy of the Jacksonian type may occur in a great variety of organic lesions of the central nervous system irrespective of the site of irritation. If in all such cases the convulsive seizures present the same clinical picture as in cases with a distinct lesion in the cortical motor area, it is because of the anatomico-physiological reasons, considered on the foregoing pages. The site of the lesion consequently must not necessarily be in the motor area itself.

A. Boetiger¹⁵ reports three cases of traumatic epilepsy, in none of which the injury occurred in the motor area. G. Robertson¹⁶ reports a case of injury to the head and body during a fall. Convulsive attacks developed on the entire left side. A decompression of the right subtemporal region was performed. No clot was found over the right motor area (suspected during life), no laceration of the cortex was present. Autopsy revealed no fracture of the skull, but a hemorrhage in the lateral ventricles.

All such cases, as well as the experimental investigation, tend to prove that any segment of the brain possesses epileptogenous properties, and that the mechanism of epileptic convulsions lies fundamentally in the disturbed function of the cortical motor cells, the impulses of which are influenced by morbid foci in any region of the intracranial tissue.

¹⁵ *Mediz. Klinik.*, No. 18, 1918, p. 443.

¹⁶ *Practitioner*, 1922, 109, July-December, p. 320.

REMARKS ON THE CORRELATION OF PSYCHOLOGICAL AND PHYSICAL SYMPTOMS IN THE PSYCHO- NEUROSES *

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Two main interpretations exist as to the origin of the psychoneuroses. The first is that they are of psychological origin, dependent upon mental causes, and the second that they are dependent upon some physical cause. These views have been somewhat contradictory in the past, although not entirely so.

While from an organic standpoint studies as to the gross lesions of the nervous system have not thrown much light on the psychoneuroses, evidences of disturbances of the vegetative nervous system and endocrine functions are met with frequently.

The present situation, therefore, is that both psychological and physical points of view have much to support them. Can both points of view be explained in such a way that one does not exclude the other, and that both may contribute to the explanation of the disease?

In respect to the onset of a psychoneurosis, the early symptoms and the varied course of the disease, many interesting facts have been observed. The disease is extremely variable, and in the development of any given case several different courses may be followed. While those most frequently seen have a long course, and often show little change in symptoms from month to month, or from year to year, this clinical picture is by no means the rule. Another type of case is one showing acute episodes, the symptoms lasting for some months, but then completely disappearing. Occasionally a case is seen where a psychoneurotic condition exists for three or four years, and then the patient becomes well, and remains well almost indefinitely. The outcome of the disease is far from uniform. Why do some cases recover after a few months, some only after several years, and some not at all?

Again, striking changes may take place in the symptoms in any given case. At certain times during the illness physical symptoms,

* Read before the American Neurological Association, Philadelphia, June 7, 1924.

such as fatigability, disturbed heart action, tremors, respiratory difficulties, dizziness, fainting, gastro-intestinal symptoms, and loss of weight, may be chiefly complained of. At other times these symptoms are in abeyance, and mental symptoms such as anxiety, compulsive ideas, and phobias are most important. In the same patient, at different times during the course of the disease, changes occur in the symptoms. In many cases it appears that mental factors cause the physical as well as the mental symptoms; in other cases endocrine disturbances appear to play a very important part.

Although this disease cannot be produced experimentally, it is seen with great frequency in all medical practice. There has always been a wealth of material. During the war, however, more cases were seen together than probably ever before at one time. These war cases offer an opportunity for studying the disease throughout its entire course. After these years it may be possible to draw some conclusions from them which will have a practical application to civil life cases.

With our present perspective it now seems possible, from one point of view, to divide the war cases into two definite types, and these two types have an important bearing upon theoretical consideration of the psychoneuroses.

The first of these war groups, and by far the largest which has been reported, are cases in which mental causes predominated at the onset. They showed the usual mental symptoms of the psychoneuroses seen in civil life, developing from emotional causes. This emotional stress, after lasting for a period of a few weeks or months, developed into well known clinical pictures showing anxiety, phobias, and other mental symptoms.

If a schematic reconstruction of the course of these cases is made it is seen that they went through a definite evolution.

As already stated, after a prodromal period of anxiety and emotional stress the condition developed through crises of fear and anxiety. This was the first phase, which often lasted for months with very little change. Then one of two things happened. Recovery gradually took place and the patient returned to his former state; or, what is more noteworthy, recovery did not occur and other symptoms developed.

In the cases where recovery did not take place, disturbances of the vegetative nervous system, at first not very prominent, were gradually added to the clinical picture; or, to put it more accurately, these physical symptoms became continuously in evidence, whereas they only colored the clinical picture at first. In time cardiac action

became much disturbed; gastro-intestinal symptoms, at first infrequent, became continuous; and to these were added fainting attacks, vertigo, fatigability, circulatory disturbances, and other familiar physical symptoms. Physical examinations at this time often showed disturbances of the vegetative nervous system, and varying degrees and combinations of thyroid, pituitary, and adrenal disturbances. In other words, in this particular group of cases, endocrine and vegetative nervous system disorders, at first not very much in evidence, eventually became the most important part of the clinical picture.

This clinical picture has persisted now for five years or more. The mental symptoms are relatively not quite as prominent now as in the beginning. The emotions seem to have become blunted and these patients are exhausted mentally. But while they may be more composed mentally than at first, they have well established vegetative nervous system disturbances of the type above mentioned. What at first, then, seemed to be a psychological disorder almost entirely, in the end is quite as much, if not more, physical than psychological.

The second group of war cases, less frequently recognized but perhaps quite as frequent in reality, differs from the first. The physical findings in this group, considered collectively, are of much significance. The physical examination of these cases from the first showed endocrine disturbances both in body structure and in functioning; namely, variations from the normal in height, in the proportion of trunk and extremities, the texture of the hair, the skin, in the circulatory system, and in other well recognized endocrine conditions.

This second group, rightly or wrongly, have been classified as psychoneurotics. They, too, showed a prodromal period and a subsequent evolution of symptoms as time went on, but differing from the first group. What occurred to them was as follows: They broke down under physical stress. They were fatigable, they were not very efficient, and they either were or became what is termed neurotic. Many of their symptoms, such as low blood pressure, disturbances in circulation, failure in suprarenal and thyroid functions, predisposed them to mental disturbances, including anxiety and depression. These cases, therefore, after they had labored under these physical handicaps for many months, gradually began to show symptoms in the mental sphere very much like those of the first group.

These latter, then, eventually became confirmed psychoneurotics, scarcely distinguishable on examination from the first group. Although the mode of onset and the underlying causes of these two

groups were very different, the end result was very much the same, both from the physical and psychological standpoint.

The majority of all of the war cases, both of the first group and of the second group, now show both physical and mental disturbances. While in the beginning the mental disturbances were more generally observed, now the physical disturbances on the whole predominate; at least, there is scarcely a case now where certain physical disturbances of the type mentioned above do not exist.

Is it possible that our civil life cases, which look more or less alike after the symptoms have existed for some time, may be as inherently different as to their mode of onset and development, if the symptoms could be analyzed, as are these war cases?

The fact that emotional stress and mental factors influence mental functions has long been known. The influences of fear, anger, grief, and apprehension, on cardiac action, peripheral circulation, and the secretions, has often been demonstrated by laboratory experiments. Serious and prolonged mental disturbances, resulting from emotional stress, as shown in the war cases, had been observed in civil life cases, although not as extensively.

What was less clear, and what may not now be acceptable to everyone, is that mental causes operating through the emotions over a long period of time bring about a disordered condition of the endocrine and vegetative nervous system which may be of months', possibly of years', duration. There is much evidence, however, to show that these events may take place.

It is possible that herein lies the apparent contradictory interpretation as to the causes of the psychoneuroses. Both points of view are correct. There are psychological causes without doubt, and there is every reason to believe that there are physical causes in respect to the vegetative nervous system. Either one kind of soil or the other may be found in any case, and from this soil all the subsequent symptoms are added.

This interrelationship, therefore, of mental and physical factors may explain the variability in the course and outcome of this disease.

Those cases seen in civil life, of short duration and with disturbances mainly in the mental sphere, may have great resistance in possessing a stable endocrine and vegetative nervous system. In these cases, when the mental causes are removed, the patient has a very good chance of recovery and of escaping a prolonged course. In these instances the exhausting secondary physical symptoms referable to the endocrine and vegetative nervous system do not develop.

Those cases of long duration, with many physical disorders, may

possess an unstable and vulnerable endocrine system which breaks down under slight stress, and here, even if the mental causes are removed, the physical symptoms continue for a long time.

Again, a certain number of cases may be interpreted as a primary breakdown in the endocrine and vegetative system, and this is followed sooner or later by mental disturbances.

Many cases, possibly a high percentage, are almost entirely mental in the origin of their symptoms, and they remain mental during the entire course of the disease and show very few symptoms referable to the vegetative nervous system. Often these cases, however, although evidently almost entirely psychological in character throughout, may at times show disturbances of the vegetative nervous system.

Some such theory may explain why a certain number of patients improved under the rest cure, a form of treatment now generally frowned upon, although at one time generally approved. It may also explain why psychotherapy in any form whatsoever is not sufficient in all cases, particularly those of long standing. It may likewise explain why endocrine treatment, at times apparently of no value and at times of uncertain value, occasionally appears to bring about remarkable results.

Further deductions in relation to the onset, symptoms, and outcome are apparent in explaining civil life cases, if this interpretation of the war cases is warranted.

In any event, it should be clear that a psychoneurosis is not to be entirely explained either upon a mental or a physical basis. As stated above, two modes of onset may be distinguished: First, those where mental factors play the most important part in the beginning; and second, those where vegetative nervous system disturbances stand out prominently from the onset. Possibly until recently we have not sufficiently appreciated that disturbing emotional states acting over a long period may result in prolonged vegetative nervous system and endocrine disturbances, and that these disturbances may explain the prolonged course of the psychoneuroses in many instances.

It seems clear, therefore, that psychoneurotics are vulnerable from either the physical or the mental standpoint—or both. The mental constitution of these cases is fairly well understood. We are as yet far less clear as to their physical constitution. The study of biochemistry, as related to the endocrine and vegetative nervous systems, seems the most fruitful physical approach so far.

Alterations in body chemistry and in the functioning of the endocrine and vegetative nervous system may not always result in disease, but possibly they partly explain these so-called neurasthenic constitu-

tions, the soil for a psychoneurosis. Therefore, as our knowledge of biochemistry increases, an ever-increasing parallelism between physical and mental constitutions may be worked out. As a result, what may only be a surmise now may be a certainty later; namely, that we will not think of physical causes or mental causes independently in these disorders, but of both as inseparable causes of the disease.

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EXTRA-PYRAMIDAL HEMIPLEGIA

(AN ANALYSIS OF A CASE WITH "FORCED ATTITUDE" OR
ZWANGSSTELLUNG)

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I.

The symptomatology of the lesions of the extra-pyramidal system has undergone new investigations since the appearance of the post-encephalitic Parkinsonian syndromes. Before that time the problem was limited to the discussion of the lesions caused in cases of athetosis, the *Etat-Marbré* of Vogt and other diseases of the basal ganglia. The work of Hunt on his famous case of juvenile Parkinson started a new view in the matter. However, cases like the one that I am going to report here are not often met in literature, except the two cases reported by Pineas in 1923.(1) He also gives a review of the literature on the subject. I have not found similar cases in the literature, although I am certain that such may be classified under different groups, lately probably as encephalitis.

Though there is a great similarity in the clinical manifestations of both conditions, there are, on the other hand, on closer observations and examinations, points which make them two different conditions. In encephalitis, irrespective of the onset and course, in the first place we have a distinct history of a disease with cranial nerve involvement. I have so far failed to find a genuine case of encephalitis where cranial nerves were not involved. Even in the cases of latent or ambulatory encephalitis,(2) cranial nerves were always affected. And the affection of the cranial nerves was always the initial symptom. The course of the disease itself is also of such a nature that, irrespective of the dissimilarity between the various cases, there is always a link which binds them together.

An entirely different picture is found in the case which I am reporting here. There is a difference in the onset and course, and also a difference in the clinical findings and the general appearance of the patient. I firmly believe that the syndrome is one of a lesion of the extra-pyramidal system, vascular in nature, which had nothing to do with encephalitis.

II.

History: Jewess, forty-two years old, born in Russia, married and mother of two healthy children. The family history and her own past history is of no importance. She never had venereal diseases, no miscarriages and no serious illness. She had no attack of influenza, before, during, or after the epidemic of 1917. She was always a hard working woman and not addicted to drugs or alcohol.

Her present illness started about two years ago, when she began to feel weak in her right upper and lower extremity. This weakness came on suddenly. She noticed that she was unable to carry on her work with the right arm and that she was unable to walk properly. The weakness remained stationary until about four months ago, when she began to show mental deterioration and the peculiar attitude of to-day. Her gait became difficult and very slow, her arms heavy and she failed to perform the actions as readily as before. Her speech at times was indistinct, showing a peculiar swallowing of words accompanied by excessive salivation. She laughed continuously and at the slightest provocation. She did not answer questions and frequently she appeared as if she did not understand the questions asked. Most of the time she remained in a peculiar stiff attitude, the entire body was rigid, and she persisted in the attitude for a long time if not interrupted. She also showed loss of mental faculties. She was many times on the point of removing her clothes in the ward, or she would wander around apparently unaware of her condition. Bladder and rectum control was good.

From the history, as far as could be verified, it appears that the weakness in the right half of the body came on suddenly after a day of well being, that her condition remained stationary until four months before admission, when a progression appeared. The progress of the disease was manifested in the increase in rigidity, the "forced attitude" of the patient and the mental deterioration.

Examination: Gait: She starts walking with the left foot, making a step of about a foot immediately in front of the right foot. As soon as this step is made she again lifts the left foot, making another step of about the same length. When this second step is finished, she lifts the toes of the right foot from the ground, rotates the foot on the heel and finally she shovels along the right foot for a short distance. The steps are made in short succession, the body moving up and down like on springs and the patient gives the impression that she is dancing, using the right heel as a pivot. She always starts walking with the left foot and the steps are always the same. During this performance her body is slightly bent forward, her arms abducted from the chest and the forearms flexed at the elbows. There are no associated movements of the arms. She keeps her mouth wide open, a "silly" smile on her face, occasionally profuse salivation. During walking there was a slight flexion of the left leg at the knee, but none of the right leg, in fact the right leg was moved in its entirety, and practically—with the exception of the toes—never lifted from the ground, but only shoveled along.

When walking with bare feet, following facts were noticed: The left foot came down with toes in straight extension—except occasionally with dorsoflexion of big toe—at the same time the right toe showed attempts of plantar flexion and the other toes extended. The attitude of gripping the

ground, like in healthy individuals, was absent in our patient when walking. There was a decided paresis of the right leg.

The walking analyzed above, was during spontaneous walking. To make steps on command, she showed a different aspect. The entire body stiffened and though the voluntary effort seemed to be present on the side of the patient, she was nevertheless unable to perform the action to any great extent. The body began to oscillate slightly, then the oscillation became more pronounced, and finally after a number of attempts the patient was able to make a step.

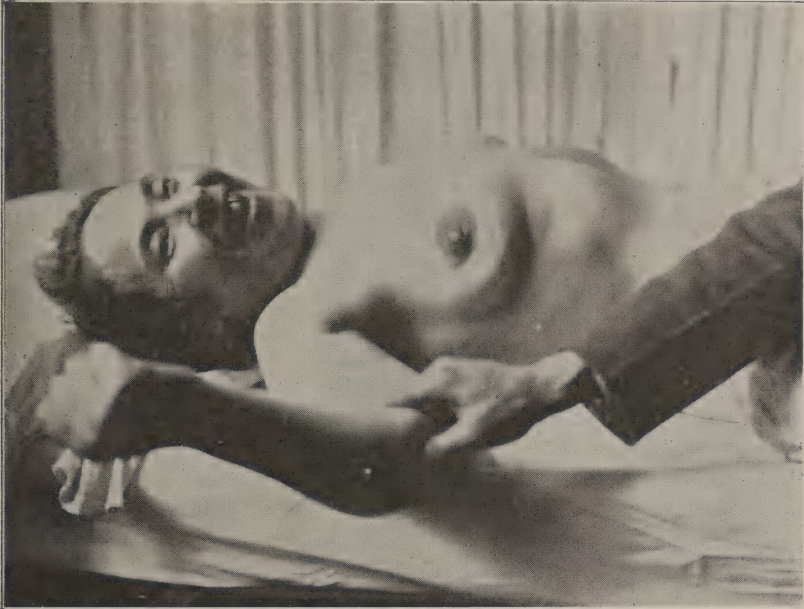


FIGURE 1. This photograph shows patient when lying down after some exhaustion during the examination. The facial expression the same as before. The rigidity was marked on account of her attempt to lift the right arm.

That increase in rigidity was also noticed, if the command to stop was given while she was walking. Whenever a voluntary motion was to be performed the rigidity increased and practically made the performance of the motion impossible.

Following observations were made with the patient sitting on a chair and ordered to perform various motions:

On command to lift the foot from the ground, there was at first an increase in the rigidity, then a slight oscillation of the foot similar to a tremor, then inversion of the foot, slight plantar flexion of the big toe and finally extension of the foot and lifting of the heel from the ground. Practically the same was noticed on the command to flex the foot at the ankle. To extend the leg at the knee, there was always the same initial rigidity, oscillation, inversion of foot and finally a very weak extension. Flexion was

very weak. In difference to the difficulty in performing of voluntary motions, the passive motion was much easier to accomplish, the rigidity was not so marked and it was easily overcome.

The difficulty noticed with the right foot was less marked with the left foot and whereas the right toe always showed a plantar flexion, the big toe of the left foot showed a dorso flexion. There was a tendency in crossing the left leg over the right and in walking; we mentioned before that the right foot when brought forward was immediately behind the left. It gave the impression of the scissor effect of Little's disease. The tonus of the left leg seemed otherwise normal.

The knee jerks varied from time to time. If elicited at the beginning of the examination they were brisk on both sides, more so on the right. If elicited late during the examination when the patient was exhausted they were diminished, or on account of the induced rigidity impossible to be obtained. The phenomenon of Schuster (toe flexion), which is considered a counterpart of the Rossolimo sign, but present only in extrapyramidal lesions, was obtained a few times.

There was no Babinski. The abdominals were absent. No atrophies were present.

Upper Extremities: Motions on command with the right arm showed an increase in rigidity, but not so marked as with the right foot. There was a great weakness in motions and also a limitation of movements. Instead of the oscillation noticed with motions of the leg, the right arm showed as voluntary motion was attempted the appearance of a tremor, irregular at first, then of bigger amplitudes, finally a regular athetosis. The action was rarely accomplished. If the patient was going to shake hands, she never fulfilled the act. At the same time the left arm was performing the same motions except for the tremor. During passive motion the rigidity was easily overcome and no tremor was present.

Skilled movements could not be performed, at any event not on command, though at other times she was seen to be able to button or lace her shoe with ease.

The bodily attitude of the patient, during walking or while standing up, was like that of a Parkinson patient, but while walking, though she did not show the presence of the associated movements of her arms, they would, on the other hand, begin to be lifted higher and higher until the patient would give the impression of climbing an imaginary ladder.

Speech: At first I was inclined that the patient suffered from a sensory motor aphasia, but on examining the patient from time to time, I convinced myself that the speech capability varied from time to time. Her speech was indistinct, "swallowing words," at times slurring, reminding one of the bulbar speech, at other times it gave the impression of a dysarthria. The sentences that she could not pronounce at a certain time would be pronounced with ease at other times.

In the general attitude of the patient another striking feature was the expressive part of the face during attempts to talk. Mimic was entirely lost. Irrespective of the nature of the conversation she showed no change in her facial expression. The facial expression as seen in the photograph never changed during the entire time that she was under my observation.

III.

In reviewing the salient points of the case, we find, in the first place and the most marked, the statuesque attitude. It is the most outstanding picture as soon as the patient is seen. This attitude resembled a wax figure where the expression never changed. That attitude, on examination, was seen to be determined by the condition



FIGURE 2. Photograph of the patient showing her attitude during an attempt at walking. The facial expression is the one she had at all times. Notice the toes of the left foot (nonparalyzed), where the absence of gripping the ground is present.

of passive rigidity in which the patient was. I have frequently examined the patient in reference to the rigidity, and I came to the conclusion that it was something entirely different from the hypertonia found in spastic conditions. In the first place, in hypertonia due to a spastic condition, a certain group of muscles, synergic in action, are in a condition of increased tonus. In examining my case I found that the rigidity is present in the agonists and the

antagonists. It is equally distributed among all the muscles. It is true that there was a difference between the rigidity of the left leg and the right leg, but the flexors as well as the extensors of the right leg were in the same degree of rigidity. This condition can only be explained as shown by Filiminoff by conceiving that the pyramidal system was intact and that the system working as an antagonist to the pyramidal system was affected.(3)

To determine the condition of tonus in the various muscles of the patient, I repeated the series of experiments made by A. Simon.(4) His experiments were based upon the work of Magnus and Kleijn and Sherrington upon the decerebrate animals. He examined a number of hemiplegics of the spastic type, and also other patients of the extra-pyramidal lesions, and tried to find the relationship between head position and tonus. In none of the experiments undertaken with my patient would I find any relation between the position of the head and increase of tonus in any muscles of the body. In one word I came to the same conclusion as that reached by Simon, that "all the patients with extra-pyramidal lesions, that is, those patients without any lesion of the pyramidal tracts, never showed any neck reflexes; at least I found no exception to this rule." This is a very important point of diagnostic value in the differentiation between the lesions of both systems.

The very same explanation that we are dealing in this case, with a lesion to a system antagonistic to the pyramidal system, can explain the loss of facial expression. It is also a concomitant of the attitude of the posture. By the lesion of the extra-pyramidal system the entire musculature fell into a certain position. In a normal person the normal attitude is obtained by a balanced distribution of tonus between the various muscles of the body, agonists and antagonists. In this patient, and in all the patients with extra-pyramidal lesions that distribution is destroyed, the relationship between the muscles antagonistic to each other is disturbed.

I will, therefore, not conceive the rigidity noticed in patients with extra-pyramidal lesions as a simple hypertonia (*cf.* Tilney)(5), but as an increase in tonus between all the muscles, agonists and antagonists. It is this general hypertonia which prevents the performance of motion and which brings forth tremors and athetoid movements on the attempts of voluntary motion.

In this connection it may be interesting to recall the experiments undertaken for the determination of the relation between muscles tonus and muscular resistance by Lewy and Kindermann.(6) The findings of these authors undoubtedly confused the consistency of a

muscle with the resistance offered by a muscle. As a matter of fact, all the instruments used so far failed to give uniform results. The only conclusions that I could draw from their work was that rigidity of a muscle means that the consistency of that muscle is increased, and therefore it requires a stronger power to depress it; in one word, it will offer a greater resistance to outside pressure attempting to depress it. But it will not prove that increased rigidity means increased tonicity.

The disequilibrium between the tonus of the antagonistically acting muscles can be seen clearly in the increase of the rigidity during the attempt of voluntary motion. On passive motion, it was remarked above, the rigidity may increase, but it is easily overcome. On voluntary motion, on the other hand, the rigidity increases to such an extent that the action is practically prevented. It is necessary in the contraction of certain muscles and the relaxation of others that an action should be accomplished. But in this case both sets of muscles become rigid, contract. It appears that in such cases the inhibitory power of the pyramidal system is lost, a fact which takes place in such lesions of the extra-pyramidal tracts. There is no doubt in my mind that this fact is responsible for the peculiar speech defect in such cases. It is not a dysarthria, but an impossibility to talk and articulate on account of the rigidity. Any attempt, voluntary of the patient, increases the rigidity to such an extent that the pronunciation of words is impossible. If we notice the post-encephalitic Parkinson patients when they talk we can easily see that they barely move their jaws and that the excursion of the lips and tongue during speech is very limited.

According to Hunt, the rigidity as manifested in such patients is a condition of posture, a static condition. On the other hand, during attempts of voluntary action, when the rigidity increases, we are dealing with a condition of kinetics. If we examine carefully the two conditions, should we be forced to accept that we are dealing with different sets of fibers, different systems? Posture is undoubtedly the inherent state before and after motion, but in the passage from the static to the kinetic state we are only dealing with a change in posture. Motion, in ultimate analysis, is only a number of successive changes from one stage of posture to another. It can be decomposed into numerous such stages. The act of walking is a series of successive and simultaneous contractions and relaxations of various groups of muscles. Each contraction could be separately examined and the motion, at least theoretically, stopped at the end of any stage, a separate change in the posture. Though, in my case,

we noticed that the efferent system is intact, the posture is at each step of motion changed qualitatively, the rigidity increased. There is, with each step, a tendency to remain in the fixed posture, and the only thing that the intact efferent system is able to accomplish is a disordinate action manifested by tremor. Undoubtedly this is evidence of an overstimulation of the efferent system. It is therefore the lesion of one single system, the system acting as an antagonist to the efferent system which is at fault in the extra-pyramidal lesions, and it is not necessary to assume numerous other systems, static and kinetic, existing in the extra-pyramidal system to explain the condition.(7)

In the same manner does Foerster explain the appearance of contractures in hemiplegia by overstimulation of pyramidal tracts, and not inhibition. If, for example, the extensors of the arm in an hemiplegic are paralyzed, there will be a tendency to contracture of the flexors. The contractures do not appear until the patient begins to show some motion returning in the paralyzed muscles. He will attempt to exercise the muscles paralyzed, neglecting entirely the antagonists. This overstimulation of one set of muscles, according to reciprocal innervation, produces an inhibition in the antagonists, and the result is an attempt to remain in a fixed posture, causing contracture. We have therefore an overstimulation which is responsible for the inhibition. In cases with lesion of the extra-pyramidal system, the overstimulation of the pyramidal tracts (absence of the antagonists) causes the inhibition and tendency to remain in a fixed posture.

IV.

In summarizing, it appears that in lesions of the extra-pyramidal system we are dealing with a disturbance of the postural element. The so-called kinetic element does not appear to be incorporated in the system. It is therefore a question of statics only, and not more. A further analysis of our case will help elucidate the matter further.

Gait is primarily dependent upon the integrity of the metameric system. It is due to extero- and proprio-receptive stimulation which takes place in the various segments of the spinal cord. In order that gait should take place we must have a series of successively alternating contractions and simultaneous relaxations of various muscles. To the contraction of the flexors of the foot there is a simultaneous relaxation of the extensors. At the same time not one muscle is in action but a series of them, a group of muscles depending upon various centers in the different spinal cord segments. There is, according to Monakow, a synchronicity of the entire action

and which, only in that way, becomes an orderly action. In accepting the theory of reciprocal innervation we are able to understand the entire process. In examining our patient we find that in making a step she puts the left foot on the floor, slight inversion of the foot takes place, a slight flexion of the leg at the knee, and simultaneously there is an increase in the rigidity of the flexors of the right foot and leg, a slight oscillation takes place and also the phenomenon of irradiation of rigidity, as described by Gerstmann and Schilder.(8) This phenomenon was first described by Schilder, and he described it that the rigor in the patients suffering from extra-pyramidal lesions is spreading when once induced from the part where it started to adjoining parts. It was observed in my patient starting in the flexors and practically at the same time in the extensors, and it gradually spread over the entire lower extremity, following the line of muscles which successively should have taken part in the production of walking. It is this rigor which prevented the patient from walking and which, if we accept the opinion of Strümpell,(9) was responsible for the oscillations and the athetoid movements. This also showed the stimulation of the metameric segments was present. However, I noticed that the rigidity was spreading not only upon the muscles of the leg but that in a few seconds it was over the muscles of the entire extremity, then abdominal muscles. From the right abdominal muscles it spread to the right arm, and then oscillation and athetoid movements started in the right arm, which increased greatly in intensity as the voluntary effort of walking was present, and soon the patient showing the climbing motions (*Kletterbewegungen*) as described by Monakow.

This phenomenon—climbing reflex—was not found on examination of a great number of patients suffering from the post-encephalitic Parkinson syndrome or in paralysis agitans patients. The phenomenon of irradiation of rigidity I could not find in such cases either. However it was described in diseases affecting the lenticular nucleus and in pseudo-sclerosis.

CONCLUSIONS

(1) Lesions of the extra-pyramidal system should be considered clinically from the standpoint of posture and not motion, from the static and not kinetic standpoint.

(2) The most important symptom is the rigidity, which gives the attitude not present in other conditions. The rigidity affects the agonists and antagonists at the same time.

(3) Symptoms, like tremor, athetoid movements, facial expression, loss of clear speech, are due to the distribution of the rigidity.

(4) In some cases of a certain type two phenomena are noticed which are never found in pyramidal tract lesions, the phenomenon of irradiation of rigidity and the climbing reflex.

(5) The kinetic system is not incorporated in the extra-pyramidal system but in the pyramidal.

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SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

FOUR HUNDRED AND FIFTEENTH REGULAR MEETING, TUESDAY,
NOVEMBER 11, 1924, JOINTLY WITH THE SECTION ON
NEUROLOGY AND PSYCHIATRY OF THE NEW YORK
ACADEMY OF MEDICINE. DR. E. G. ZABRISKIE
OF THE SOCIETY, AND DR. I. WECHSLER
OF THE SECTION PRESIDED

The following program was carried out:

VASCULAR LESIONS OF THE BRAIN, SIMULATING BRAIN TUMORS

[LANTERN ILLUSTRATIONS]

DR. I. STRAUSS AND DR. JOS. H. GLOBUS

[STENOGRAPHER'S ABSTRACT]

Dr. Globus cited six case histories in detail. *Summary:* Sufficient ground for diagnosis of brain tumor was present in these cases, especially where cerebellar localization was present. Papilledema, headache, dizziness, vomiting were marked in 2 cases. In the cerebral forms papilledema was less marked. In these emotional and personality defects were more apparent. The differences relate to the two localizations and to the vascular systems involved. These cerebral tumors are compressible, and fairly elastic, causing little compression of the cerebral substance and produce some internal hydrocephalus. The symptoms are the result of destruction. In the cerebellum they may encroach on the 4th ventricle and aqueduct of Sylvius, suggesting posterior fossa neoplasm. Careful analysis shows three groups of vascular tumors: (1) cerebral lesion resulting from constitutional disease (diabetes, arteriosclerosis, lues); (2) inherent defect of the cerebral vessels; (3) mixed pathology both inherent and acquired. Vascular tumors give rise to all the symptoms of neoplasm. Careful examination outside of the nervous system must be made, before entering upon radical procedures. The authors have learned this lesson and wish to transmit its warning.

TWO CASES OF BRAIN ABSCESS, DIAGNOSED AS
ACUTE VASCULAR ACCIDENTSR. B. RICHARDSON, M.D., PHILADELPHIA
(by invitation)

In the month of August, 1924, two cases from the Neurological Services Philadelphia General Hospital, came to autopsy with diagnoses of acute vascular lesions. Autopsy in each case revealed an immense brain abscess. The clinical pictures were those of acute vascular insults. The onsets were sudden, and preceded death by eleven and thirteen days respectively. Neither case exhibited any reaction in temperature, pulse or respiration, until a broncho-pneumonia developed in the one instance one day before death; and an intestinal obstruction associated with stricture of the rectum, ischio-rectal abscess, and right inguinal hernia occurred in the other, two days before the terminal event. The complications were thought to be sufficient reason for the above reaction.

The cases referred to were as follows:

Case N.P. No. 24-158; from the service of Dr. C. W. Burr. Diagnosis: Right hemiplegia, cerebral hemorrhage. Terminal broncho-pneumonia.

The patient an adult Austrian, aged forty-seven years, an oil-cloth worker, was admitted to hospital on August 15, 1924, and died on August 24, 1924. The onset was sudden, and occurred two days before admission. The man was poorly nourished, confused, partially aphasic, and obeyed commands slowly. He exhibited marked weakness in the right face and upper extremity, and to a less extent in the right lower extremity. There was no muscular atrophy apparent. The biceps, triceps, and forearm reflexes were increased on the right side; abdominals, diminished on the right, active on the left; patellar and achilles diminished on both sides; no clonus or Babinski. The patient was continent. Sensation was not accurately determined, because of the aphasic condition; but it was not abolished. The heart was slightly enlarged, and the radials somewhat sclerosed. Blood pressure, 134/98; blood Wassermann, negative in both antigens; blood chemistry, sugar, 115, urea, 13 mg., uric acid, 2.8 mg.

On August 22, 1924, the patient became stuporous and incontinent. On August 23, 1924, the signs of a broncho-pneumonia were first observed, the left pupil dilated and fixed, and the temperature gave the first indication of a reaction. The blood pressure on this date was 116/84. He died on August 24, 1924, and the clinical diagnosis, as above indicated was thought to account for death.

Pathology: The brain was edematous. It weighed 1650 grams. The left hemisphere was larger and softer in consistency than the right. To provide accommodation for this increased bulk, the mesial surface of the left frontal lobe projected itself across the mesial plane, and became invaginated into the mesial surface of the right frontal lobe. There was also marked distention of the third

ventricle. On horizontal section of the cerebral hemispheres, an abscess, five by four cm. in diameter was revealed in the left basal ganglia area. Pus from this abscess cavity showed a streptococcic infection. Microscopical examination of sections taken from the wall of the abscess cavity, and adjoining areas, by Dr. N. Winkelman of the Neuropathological Laboratory, Philadelphia General Hospital, disclosed a marked glial proliferation, with polymorphonuclear invasion, the glial proliferation predominating. The general autopsy confirmed the clinical diagnosis of a bronchopneumonia, and revealed a chronic adhesive pleuritis; a chronic interstitial myocarditis, and chronic interstitial pericarditis; cloudy swelling of the liver, and passive congestion of the kidneys, but no focus of infection to account for the immense brain abscess.

Case N.P. No. 24-159; from the service of Dr. James H. Lloyd. Diagnosis: Left hemiplegia, cerebral thrombosis. General Arteriosclerosis. Intestinal obstruction.

The patient, a very light, colored male, a chef by occupation, was admitted to hospital on August 16, 1924, and died on August 26, 1924. The onset was sudden and more progressive than the previous case. On the evening of August 12, 1924, he suffered from a severe frontal headache. Headaches to this man were not uncommon, for both he and his mother suffered with migraine which was associated with gastric upsets. With this headache there was no gastric disturbance. The following morning, August 13, 1924, he awakened to find his left upper extremity and face paralyzed, and on the following morning, August 14, a paralysis of the left lower extremity. The condition remained stationary until one P.M. Saturday, August 16, 1924, at which hour he was seized with a general convulsion, which affected the left side of the body more than the right. Previous to this convulsion, the patient had not presented any abnormal mental symptoms. Now he was confused, drowsy, and incoherent. This led to the man being admitted to hospital late the same day. He was found to be drowsy, but easily aroused. His speech was thick and almost unintelligible; and while disoriented as to place, he was not disoriented as to time and still recognized his relatives. The head and eyes were deviated to the right, the left upper and lower extremity could not be moved voluntarily, but at times he exhibited involuntary jerkings of the adductors and abductors of the left thigh, and purposeless movements of the left upper extremity. The muscles showed no evidence of wasting. The biceps, triceps, and knee jerk on the left were increased. There was no abdominal response on either side, and no plantar response on the left. The left side of the face presented an ironed out appearance, with definite weakness of the left side of the mouth, and inability to close the left eye as tightly as the right. Pupillary reactions were normal. The tongue deviated to the left on projection. It was not possible to arrive at definite conclusions in the matter of sensation, other than to say that sense perception was not abolished. The borders of the heart were within normal limits, but

the heart sounds were of a poor quality, and extra systoles were observed about every forty beats. Blood pressure, 120/86. The radials were definitely sclerosed. On the right side, there was an inguinal hernia. The patient also suffered from stricture of the rectum as well as ischio-rectal abscess. This stricture had caused him much trouble in the last few years, and required almost daily dilation to prevent obstruction, and permit movement of the bowels. After admission to the hospital, this led to complications which were thought to account for the deepening coma, and rise in temperature which made it's first appearance on August 22, 1924. Movement of the bowels became impossible. Enemata brought only mucous and blood. The patient became rapidly more comatose. The jerking of the adductors and abductors of the left thigh, which had been in evidence, were not seen after August 22, 1924. The temperature continued to rise. The hernial sac was obstructed with feces. Surgical consultation advised against operative interference. The patient died on August 26, 1924.

Blood Wassermann was negative in both antigens. Blood chemistry, sugar, 120 mmg., urea, 28. mmg., uric acid, 3.8 mmg.

Pathology: The brain was definitely edematous. It weighed 1450 grams, and the right hemisphere was found to be larger and softer in consistency than the left. The mesial surface of the right frontal lobe presented a markedly rounded projection, which invaginated itself into the left frontal lobe. There was, as in the previous case marked dilatation of the third ventricle into the interpeduncular space. The pia arachnoid of the convex cerebral surfaces, was definitely milky in color. On horizontal section of the cerebral hemispheres, just as in the other case, an abscess cavity was revealed, which measured two and one half cm. by five cm., and which was found to occupy the basal ganglia region of the right side. Some of the changes were very evidently due to post mortem softening, but by no means all, as will be seen by the microscopical findings. Sections were taken from the wall of the abscess and the adjoining areas. Dr. Winkelman reports these sections as showing very marked polymorphonuclear invasion and glial proliferation, the polymorphonuclear invasion being the more marked. The vessels of the area were engorged, and were surrounded by collars of gitter cells. The pia arachnoid showed irregular clusters of polymorphonuclears.

The general autopsy revealed a miliary tuberculosis, with acute fibrinous pleuritis, and broncho-pneumonia; chronic interstitial myocarditis and arteriosclerosis (slight), hypertrophy, fatty degeneration and fatty infiltration; chronic splenitis, and chronic interstitial nephritis. The pus from the brain abscess in this case, which so far has not been mentioned, showed a gram positive organism which resembled the colon bacillus, as well as streptococci. This finding is, therefore, associated with the ischio-rectal abscess, which is taken to be the focus of infection.

In Case No. 24-158, the predominance of glial reaction over the polymorphonuclear invasion suggests that the condition is of a

chronic nature; while in Case No. 24-159, the marked predominance of the polymorphonuclears shows that the reaction has been acute; that the glia have not had sufficient time for such changes as are exhibited in the previous case, but even as it is, there is marked glial proliferation.

These two cases demonstrate that brain abscesses may have acute onsets without fever, and simulate acute vascular insults, especially if located in the areas adjacent to the internal capsules. The inference then is: if patients present pictures of acute vascular lesions, and foci of infection are known to exist as occurred in Case N.P. No. 24-159, the possibility of brain abscess by metastasis should not be forgotten.

The above cases are presented through the courtesy of Doctors C. W. Burr and Jas. H. Lloyd.

ACUTE SEROUS ENCEPHALITIS: A NEWLY RECOGNIZED DISEASE OF CHILDREN

DR. CHARLES L. BROWN, OF BOSTON (by invitation), AND DR. DOUGLAS SYMMERS (by invitation)

[AUTHORS' ABSTRACT]

In the summer of 1923, Brown, working at the Children's Hospital in Boston, observed six cases of a rapidly fatal disease in children, attended by symptoms referable to the central nervous system. Five of these cases were investigated post mortem. In the summer of 1924, Symmers, working independently at Bellevue Hospital, observed five cases presenting clinical and anatomical changes identical with those encountered in Boston. The youngest child in the series of ten cases was twenty-two months of age, the oldest, seven years. The diseases occurred five times in males and five times in females.

Clinically, it is characterized by rapid onset and is initiated by such symptoms as irritability, lack of appetite, vomiting or diarrhea, or both, and noticeably often by sore throat, the whole followed by elevation of temperature, sometimes to the extent of 105° or 106° F., and by signs referable to derangement of the central nervous system, among them bulbar signs in the form of respiratory irregularities, ptosis, strabismus, nystagmus, papilledema, retraction of the angle of the mouth, localized muscular twitchings, rigidity of the neck or jaw, hemiplegia, coma, convulsions and death within 36 or 48 hours, or, at longest, a few days. The most striking feature of the convulsions is that they are absolutely uncontrollable by any of the measures commonly employed for this purpose, including the use of such drugs as morphine and chloral. Two clinical types are recognizable. In one convulsions are associated with one or several of the localizing symptoms just enumerated; in the other the only

obvious symptom referable to the central nervous system is to be found in the convulsions.

Anatomically, the disease is characterized by extreme enlargement of the brain. The pia arachnoid presents an intense degree of engorgement; the convolutions are flattened; the sulci are obliterated and the brain is exceedingly soft.

Microscopically, the most constant changes are to be found in hyperemia and edema of the pia arachnoid, engorgement of the blood vessels of the brain, perivascular and pericellular edema, with or without vasculature of the ground substance and acute cloudy swelling of the pyramidal cells. Every capillary in the brain is crowded with red blood corpuscles, almost to the point of bursting. Hemorrhages into the brain, however, are conspicuous by their rarity. Practically every one of the blood vessels is surrounded by an apparently empty space, corresponding to an area of edema. In places, the microscopic picture is marked by the presence of innumerable glia cells, each of which lies in what appears to be a vacuole, but which again represents an area of edema. In some cases there are focal collections of a dozen or more cells made up of glia cells, together with cells of the lymphocytic type and an occasional polynuclear neutrophile. In none of their microscopic preparations, including practically every part of the brain, have they in a single instance encountered the cellular infiltration which is so characteristic of poliomyelitis and epidemic encephalitis. On the other hand, the intense injection of blood vessels and the presence of clear spaces around the vessels and cells, corresponding to areas of edema, lead them to believe that they are dealing with a vascular disease attended by the escape of serum rather than cells; that is to say, that the disease belongs in the same *general category* with the so-called encephalitis lethargica, differing from it, as indicated, in several histological essentials. They apply the descriptive title of acute serous encephalitis and believe that is is a form on infection and that it presents, clinically and pathologically, a picture which has not hitherto been recognized and described.

Discussion: Dr. C. T. Sharpe (by invitation) said: In 1917, I presented before a meeting of the Neurological Society a paper on edema of the brain in the infectious diseases at the request of Dr. Tilney who was then president. I wish, therefore, to take exception to the title of the paper presented by Dr. Symmers and Dr. Brown, and draw the attention of the society to the report of my paper as published in the *Journal of the American Medical Association* for January 18, 1919, volume 72, page 159-162.

Dr. Tilney was very much interested in my cases, and Dr. Casamajor and others came to the hospital and confirmed the clinical findings before the cases were reported. I was under the impression at the time that a new clinical condition had been hit upon, as there was no presentation in the literature on edema of the brain *per se*. As a clinical entity I believe this to be true to-day but edema of the brain was recognized many years ago.

Conde, writing in 1858 upon measles and scarlet fever refers to it very definitely, and in Copeland's *Dictionary of Practical Medicine*, published in 1847, reference is also made to the cerebral type of lesions and he reports the brain much more vascular and softer. Robert Williams' work on morbid poisons reviewed in the *Medico-Chirurgical Review* of 1837 reported a typical case that presented intermittent blindness associated with convulsions.

I have seen, in all probability, one hundred cases of this condition. Clinically there is a marked blurring of the discs and the spinal fluid is under considerable pressure. The first case I recognized in 1906 occurred three weeks after an attack of measles. He improved markedly after the most intensive outbreak of urticaria that I have ever seen.

Conde in commenting on this condition says: "There is often severe cerebral excitement with a redness of the eyes, intolerance of light, and a throbbing pain in the head, with ringing in the ears, watchfulness, confusion of mind, and delirium. To these symptoms there may succeed a state of stupor occasionally interrupted by loud screams, or by fits or violence or of fretfulness."

Dr. Casamajor said: Through the courtesy of Dr. Symmers I have had the opportunity of studying some of this material. The most striking feature in the pathological picture is the enormous hyperemia, which gives one the impression of an underlying toxic condition. Of course this may just as well be infectious but one does not see as much reaction in the tissues as one ordinarily expects to see in an infectious condition; that is, in the infectious conditions which we know best. There is no hyperplasia of the lymphocyte elements that occur in epidemic encephalitis. In the nerve cells the picture is one of a massive acute cloudy swelling such as one sees in both toxic and infectious conditions. The increase glia cells is more characteristic. There were some peculiar little foci of cells which appeared to be of mesodermal origin mixed with glia cells, and in my opinion this can mean nothing but infection. I think we are seeing here another sort of encephalitis. Epidemic encephalitis gives considerable reaction in the blood vessels with little reaction of the true nerve tissue except at the base of the brain. Here the case is quite different, with considerable alteration of the nerve cells throughout the entire brain with but little vascular reaction and no lymphocytic infiltration. I feel that Dr. Symmers and Dr. Brown have described here a new type of encephalitis. Surely there is more than one type of encephalitis and our knowledge of brain conditions in the future is going to be worked out much more accurately than it is to-day, by the studying of possibly many types of encephalitis that appear.

Dr. Strauss: A few weeks ago we learned at the hospital that Dr. Symmers had discovered a new pathological entity. We were very much interested, because whenever Dr. Symmers discovers anything we know it is something important. Just after we had

learned this, a case came into the hospital, a boy of twelve. There was a history of malaise as described in the cases here to-night, with very little temperature. He presented slight right facial weakness, weakness of the left arm and leg, with positive Babinski. He had great difficulty in swallowing. The spinal fluid showed 136 lymphocytes per c.mm. He did not appear very ill. The pediatrician said that it might be poliomyelitis, but because of the involvement of the palate there was a possibility of diphtheria, although cultures were negative. The neurologist said it was probably poli-encephalitis and probably due to poliomyelitis virus. The difficulty in swallowing was serious. The temperature gradually rose in three days to 104° F. and then the boy died of respiratory paralysis. We obtained the brain which showed marked injection of the pia. When we cut the sections of the medulla we looked for typical perivascular infiltration. We did not find it except occasionally and in insignificant amount, but around the vessels there was a perivascular space filled with granular material which was coagulated transudate. We thought we had what Dr. Symmers calls acute serous encephalitis. I am glad to hear Dr. Symmers admit that there is a possibility that it belongs to the encephalitic group. We thought this was due to poliomyelitis virus, but at this time of year there is a question whether it is encephalitis or poliomyelitis. In the opinion of Dr. Globus and myself the pathological picture is dependent upon two factors: (1) the virulence of the germs and the number of the germs and (2) the amount and virulence of toxin these germs form in the nervous system. We had one case without much perivascular infiltration, but with the vessel walls necrosed by the attack of the disease. There was diapedesis of red blood cells into the perivascular spaces and in some cases large hemorrhages. Another factor is that where the resistance of the brain is increased and the toxin is not so potent; the vessels have a chance to form a wall of defense and we see spaces in the adventitia filled with lymphocytes. The virus is more attenuated and the vessel can react with adventitia and glial elements. Finally we have another picture of an acute fulminating type in which the virulence of the organisms is so intense that before there can be any reaction on the part of the vessels you have a tremendous transudate with disturbance of the brain mechanism with early death. I saw one case lately, of a girl of 17, with Jacksonian convulsions affecting one side of the body. She retained consciousness during the attacks; the convulsions lasted three days. She ran a temperature of 101° F. Sometimes there were general convulsions. I thought it was a local encephalitic process. We gave bromides and hyoscin, morphine and magnesium sulphate intravenously without effect. We had to administer chloroform. In three days there were 136 seizures. To-day that girl is perfectly well. I feel that the diagnosis made of an encephalitic process was the correct one. I think we were fortunate that she recovered.

Dr. Osnato: We are familiar with the meningo-encephalitis as the expression of an infection of the central nervous system during

the course of many infectious diseases. This is seen frequently in children suffering from measles, scarlet fever, pneumonia, etc. At the present time I think that those who have experience with epidemic encephalitis know that we are having a little flare up in this city amounting to a small epidemic. As all these cases of Dr. Symmers' occurred in children, perhaps some disturbance of the water balance might have something to do with it. The disease is characterized by gastro-intestinal disturbances with vomiting and diarrhea, and there must be considerable loss of fluid from the circulating blood. The pathological picture may be an attempt on the part of the organism to draw enough fluid from the tissues to off-set the loss of fluid caused by the gastro-intestinal disturbances. If the water balance were reëstablished the picture might go on to one of ordinary epidemic encephalitis.

Dr. M. Neustaedter: Twelve years ago some Swedish investigators published a work on poliomyelitis and described the same pathological picture which was not accepted as that of poliomyelitis. A few years ago Larkin showed me a brain of a patient supposed to have had encephalitis with the histopathology of that shown to-night. Two months ago, I received from Doerr's laboratory of the University of Basel a rabbit brain infected with human epidemic encephalitis and showing the characteristic microscopical lesions. I have injected three rabbits with a suspension of this brain and two rabbits with a filtrate of this suspension. They all succumbed within three or six days respectively. The brains of the rabbits injected with the emulsion showed the characteristic exudative infiltration around cells and blood vessels that we see in encephalitis, while the brains of the rabbits injected with the filtrate showed the picture described by Drs. Symmers and Brown. The cultures and smears from all the brains were negative as to bacteria. Whether a toxin retained in the filtrate produced this peculiar picture of the encephalitis virus I cannot explain.

Dr. S. Rothenberg (by invitation) said: At the Jewish Hospital in Brooklyn we were puzzled with an epidemic in children suffering from partial paralysis and with atypical symptoms of meningitis or encephalitic condition. I would like to mention a few cases in the hospital at the present time. The first was one which occurred a week ago. The child had a temperature of 101° F., with paralysis on the right side; the physical findings showed double Babinski, with marked rigidity of the neck. The next day the child developed what we thought was broncho-pneumonia. There were no convulsions. The respiratory difficulty got worse and the child died but we could not get an autopsy. Another child showed an interesting condition; there was marked rigidity of the neck and the child lay on its stomach and refused to move. There was pleocytosis of 5000 cells—leucocytes. There were no other symptoms of any kind. Another case was that of a baby, eight months old, with marked rigidity of the neck; no other symptoms but some

respiratory embarrassment. The temperature was 101–2°F. The children do not look as if they are going to die. Whether these are encephalitis or poliomyelitis or serous meningitis, we do not know.

Dr. Stookey: I was called in consultation this summer to see a case in which the diagnosis was of a fulminating type of encephalitis. The child had had middle ear disease, the drum membrane was opened but no pus obtained. Two weeks later the child began to have twitching of the face with unequal pupils. Dr. Strauss gave a poor prognosis. I saw the case later to see whether there was indication for surgical exploration in the left cerebellum. We inserted a needle to the depth of 1 cm. and we obtained clear fluid in every direction of the needle. We drained off 30 c.c. of fluid from the cerebellum. There was no increase in pressure in relation to any ventricular system, such as in the 4th ventricle. We thought we were dealing with serous meningitis. The patient made a very good recovery and four weeks later was apparently cured. During the stay in the hospital the child ran a slight temperature, and for no reason at all, that I can see, as far as operation went, the child got well. I think it was perhaps of the less severe type which may recover. I cannot explain the fluid 1 cm. in the cerebellum.

Dr. Symmers (closing): I am glad to hear about Dr. Strauss' cases. I think he has described the same condition.

THE DIFFERENTIAL DIAGNOSIS BETWEEN CEREBRAL DEGENERATION, INFILTRATING CEREBRAL NEOPLASM AND INFILTRATING CEREBRAL NEOPLASM WITH DEGENERATION

HENRY ALSOP RILEY, M.D., AND CHARLES A. ELSBERG, M.D.

[AUTHORS' ABSTRACT]

The opportunity for this communication has been afforded by the death within the past few months of a number of patients who previously had been considered to be suffering from vascular degeneration but who, upon death, demonstrated the fact that they had been suffering from deep seated infiltrating cerebral neoplasms, with overlying areas of cortical degeneration.

The question of cerebral vascular degeneration involves a consideration of the two types, (1) an acute and local process and (2) a slow, ingravescent process resulting in gradual obliteration of the smaller vessels depriving large areas of the hemispherical substance of their nutrient blood supply.

The character of onset, the distribution of the pathology and the resultant symptomatology and the course serve to differentiate between these two types of vascular degeneration affecting the cortex.

Considering infiltrating cerebral neoplasm, the course is usually sufficient to differentiate it from the abrupt type of thrombosis but it seems difficult, if not impossible, to differentiate a very slow-growing, deep, infiltrating neoplasm from the results of a slow-spreading, diffuse occlusion of small vessels resulting in the clinical picture of widespread vascular degeneration. Often the position of the tumor, situated in the deeper portions of the brain, results in bilateral symptomatology, although usually the results of the growth manifest themselves as disturbances in one-half of the cerebrum.

The picture resulting from deep, infiltrating cerebral neoplasm combined with vascular degeneration is almost uniformly that of vascular degeneration limited to one cerebral hemisphere and only in the last stages of the disease does clear cut evidence of the true nature of the disturbance appear, namely headache, papilledema and vomiting.

The case histories of three patients presenting such a syndrome were given in detail. The combination of vascular degeneration arising upon the basis of an underlying occult infiltrating neoplasm seems to make its appearance by symptoms of slowly advancing vascular degeneration which in the main are confined to one hemisphere only, namely, that portion corresponding to the distribution of one of the larger vascular channels. The combination usually appears in individuals below the age at which vascular degeneration might be expected to develop and in the absence of any indications of underlying cardio-vascular pathology. The course seems to be much more steadily and logically progressive than that of a diffuse vascular degeneration.

Discussion: Dr. Elsberg: The subject under discussion is an important one both from the standpoint of diagnosis and from the viewpoint of operation. All of us are seeing patients with slowly progressive cranial symptoms in whom we are in doubt whether they have a neoplasm or degenerate disease on a vascular basis, especially when the signs are located in one area of the brain. In a patient who presents the symptoms and signs of a vascular lesion, the operation may expose a large area of degenerated brain but this does not make it certain that there is not a deep new growth which has pressed upon a large vessel and secondarily caused an extensive area of degeneration. In two patients in whom I found extensive degeneration on the operating table, papilledema developed a number of months later and at autopsy a tumor was found which had secondarily caused the degeneration. In general, if we exclude acute vascular lesions, vascular degeneration is a rare lesion and one should hesitate in a patient with slowly progressive symptoms to make such a diagnosis.

Dr. I. Strauss: I know of no situation which the neurologist faces which is more difficult of solution than when he has to say whether a patient over fifty years of age has vascular disease of the brain or a neoplasm. We are frequently confronted with that

problem. Is the softening due to thrombosis or is there a neoplasm? Cases of vascular lesion can go on insidiously and the prodromal stage can cover a long period of time. Dr. Globus and I have shown to-night three cases of lesion in the cerebellum in which there were symptoms of intracranial pressure due to interference, because of enlargement of the cerebellum through pressure on the foramina of Magendie and Luschke, giving choked disc with internal hydrocephalus. One of the cases was a young woman of twenty-seven, with a history of nephritis, and in such a case we are justified in suspecting a hemorrhage without tumor, because there is a constitutional basis for vascular lesion, yet, in face of such a situation, we may be mistaken; but if at operation we find marked arteriosclerosis of the vessels of the cerebellum, we should leave the patient alone. In the case of children we must be careful in a diagnosis of neoplasm. There are individuals of that age particularly where there are signs of thymico-lymphatic dyscrasia, in whom hemorrhages are not infrequent, though when there are signs of intracranial pressure the neurologist is in a delicate position. Shall we be certain of our diagnosis or shall we explore for cerebellar neoplasm? Neurologists are faced with a serious problem. Is there any means of help in the differential diagnosis? I think there is one aid, which may have its dangers, and that is the ventriculogram. In one case of hemorrhage into the cerebellum and into the ventricles, there was sudden death after ventriculography. That is not frequent, but there is no method used in medicine to-day that is without its dangers. A patient may die after hyoscin, but that does not mean we should not use the drug. In a picture I am going to show you of an arteriosclerotic process in an individual forty-five years old, with diabetes, the spinal fluid showed 40 cells, the ventriculogram would have thrown out the diagnosis of frontal neoplasm if it had been properly interpreted. Air is in the ventricle. The descending horn is dilated and shows obstruction of the frontal region of the brain, but we must have a lateral and an antero-posterior view also which show that the anterior horns are patent. A vascular lesion will not destroy the ventricles unless it is existent for a long time. It does not increase the bulk of the brain and impinge on the ventricles. If this method of ventriculography can be properly interpreted it can give assistance which we cannot get otherwise. As an example of the difficulty of differential diagnosis I will cite one case, of a woman of fifty-three, with speech difficulty, memory impairment, weakness of the right arm, arteriosclerosis and hypertension, apathetic, emotional disturbance, with aphasia, engorgement of the veins of the discs, arteriosclerosis of the retinal vessels, casts in urine, in whom one would surely suspect vascular history and yet there was a neoplasm. There was slow, progressive swelling of the optic discs, yet she was considered by the ophthalmologists as a case of arteriosclerosis. She had tenderness on percussion on the right side of the skull. Ventriculography was done and showed no air in the lateral ventricle on the right side. Craniotomy was done and a deep tumor found. A change in the

vessels makes one suspicious, and ventriculography makes one positive. The differentiation between neoplasm and vascular disease is difficult. The proper interpretation of ventriculograms will give us aid in differential diagnosis.

Dr. J. Ramsay Hunt said: The subject under discussion is one of unusual importance from the standpoint of diagnosis because of the frequency of vascular lesions of the brain. The possibility of tumor or of abscess comes up for consideration in many of these cases, but, in my own experience, real difficulty in diagnosis is comparatively rare if due attention is paid to the course and development of the clinical picture. The most characteristic feature of vascular lesion is the mode of onset, and only very rarely is the progression so slow and insidious as to seriously simulate tumor. Of this type I have met with three cases, in all of which there was a difference in the distribution of the lesions. In one case there was an annular focus of arteriosclerosis in the internal carotid artery which had gradually encroached on the lumen of the vessel, thus producing hemiplegia of very gradual development. In another case, there was a parietal lesion of the middle cerebral arteries partially occluding the vessel and gradually encroaching upon the central perforating arteries which pass to the basal ganglia. In this case the situation was complicated by attacks of Jacksonian epilepsy. In still another case there was a gradual development of double hemiplegia in an elderly man, associated with double optic neuritis. These symptoms in this case were caused by progressive arteriosclerotic changes with thrombosis in the basal ganglia. The error in diagnosis was caused by the presence of optic neuritis. In such cases, even with the greatest caution, differential diagnosis is very difficult or even impossible. In only one of the above mentioned cases was an exploratory operation performed because of the attacks of Jacksonian epilepsy. The patient later succumbed to abscess of the brain. In all such doubtful cases I believe that a conservative course should be pursued as regards exploratory operation.

Dr. Casamajor: I have always considered the differential diagnosis between brain tumor and brain degeneration from arterial causes as being one of the most difficult that one has to meet with in organic neurology. I am making errors in this differential all the time and I have felt that the real differentiation can often be made only by operation or by autopsy. I have not changed my mind on hearing the discussion to-night. Any tumor which infiltrates the brain and destroys the brain tissue, may be said to be a brain destruction. From the point of view of diagnosis we see the possibility of three different things happening when a tumor grows in the brain: (1) The growth element is greater than the destruction and the result is an increase in the cranial contents and an increase of intracranial pressure. (2) Another group destroys the brain tissue as rapidly as it grows and there is in these no increase of intracranial pressure. This is a pure infiltrating type of tumor and is the one

that I think accounts for those undetected tumors which are found at autopsies in the patients in our mental hospitals. In the third type, the destruction is greater than the increase of new tissue. This results in cyst formation with a decrease of intracranial tension. Here it is difficult to say that there is a tumor when there are no evidences of increased intracranial tension. Dr. Strauss and Dr. Globus have shown a series of very interesting and instructive cases and I can well see why the diagnosis of brain tumor was made in each. The aneurysm that they showed certainly acted as a tumor, giving pressure signs and the clinical signs that one would expect from tumor formation. If we are ever to be certain of the differential diagnosis between vascular degeneration and tumor formation, I think we will have to find something more accurate to go on than the history which is so apt to be incorrect. The history is the most inaccurate thing that we have for diagnosis and I feel that if we are ever to reach the stage where this diagnosis is possible in a large percentage of cases, we must find something of physical signs on which we may rely.

Dr. I. Abrahamson: Recently we have been more successful in recognizing this variety of tumor and differentiating it from progressive vascular disease. That formerly such cases appeared only rarely was due to a variety of causes; ventriculography and greater frequency of craniotomies, exploratory and otherwise, reveal many that previously were only found post-mortem.

At the Mt. Sinai Hospital, during one month we had three such tumors and one case which proved to be vascular in nature. The majority of the tumor cases, especially in the aged, are first regarded as vascular, but the steady progression of signs and symptoms, the very severe headaches, and the late but rapidly increasing papilledema, all indicate a neoplasm rather than arterial disease. In the case which Dr. Globus showed, a woman of thirty-seven, with a history of hypertension dating back fifteen years, all the signs and symptoms developed within a short space of time, the progressive papilledema and increasing signs pointing to disease of the left cerebellar hemisphere. All these indicated that perhaps in spite of the long history of hypertension, we might be dealing with a neoplasm which without operation would lead to blindness and death. Operation revealed a cyst consequent upon vascular disease. Later the signs and symptoms kept on increasing and in addition aphasia, etc., appeared, pointing to possible frontal lobe involvement originally with late cerebellar signs. A ventriculogram was made which proved unsatisfactory.

Dr. S. P. Goodhart: The difficulties of diagnostic differentiation between neoplasm and vascular lesions are at times insurmountable and even at operation our investigation may be inconclusive. The findings of eye ground changes are far from uniform. A low degree of neuroretinitis is sometimes seen in vascular insults, more especially in hemorrhage. In thrombosis and embolism I believe papilledema

is not uncommon. If, however, we find a progressive neuroretinitis reaching three to five diopters, I feel we are quite certain that a neoplastic lesion is fundamentally the cause. The introduction of symptoms through softening around or within the growth or hemorrhage into it; the compression of a vessel by mechanical pressure against the vessel wall; these conditions may greatly modify or suddenly change the symptomatology.

Dr. Stookey: I would like to agree with Dr. Strauss that the ventriculogram is suggestive, but his interpretation is entirely erroneous. The first plate was taken with the occiput down, with the plate on the back of the head. Dr. Strauss demonstrated the presence of air. The anteroposterior view only can demonstrate air in the ventricles; but the plate cannot tell you how far back the air goes; so that from the plate all you can tell is that air is in both ventricles, that they are dilated and slightly displaced; it would not allow one to say that the frontal horn was cut off or not. From these ventriculograms a differential diagnosis could not have been made.

Dr. Strauss: I have two plates of the horns taken laterally.

Dr. Stookey: If the lateral view had been taken with the head down, taken sideways and then shot through, that would show whether air had gone into the frontal horns. We have not received any particular aid from this standpoint. In these cases the differential diagnosis by the ventriculogram (when the tumor is a deep seated infiltrating tumor for which nothing can be done) is not of much use. The method does differentiate between vascular degeneration and neoplasm such as Dr. Riley presented.

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY.

1. VEGETATIVE NERVOUS SYSTEM.

White, E. P. Corson. OSTEITIS DEFORMANS IN MONKEYS. [Archives of Internal Medicine, 1922, XXX, pp. 790-796.]

A report of three cases of osteitis deformans in monkeys which followed the addition of an excess of calcium to a diet faulty in its inorganic content. The monkeys were typical examples of Paget's disease clinically and microscopically. They presented an inorganic metabolism similar to that described by DaCosta in man. The disease occurred in that group of monkeys (*Cebidæ*) which on the original diet showed a high incidence of osteomalacia. It is suggested from the results of the previous studies upon osteomalacic monkeys and from the present investigations, that Paget's disease may be just one stage in a deficiency disease. The low mineral and otherwise faulty content of the original diet might so disturb the chemical equilibrium—directly—or through the neurotrophic mechanism—or through the perversion of the ductless glands that the mere addition of excess calcium might entirely change the pathological picture. This suggestion is in accord with the histology—the initial picture of which is always a resorption of bone, with later an irregular proliferation. It is also in accord with the probable chemistry of calcification. [Author's Abstract.]

Jansen, Hans. A RARE CASE OF OSTEOARTHRITIS DEFORMANS. [Hospitalstidende, 1922, No. 23.]

A thirty-two-year-old dwarfish woman with an affection of the joints, most pronounced in both hip-joints, less in knees and shoulders; the small peripheric joints being free. The ailment had set in when she was sixteen years old. It had neither the character of rheumatoid arthritis or of rheumatic polyarthritis. X-ray examination showed an osteoarthritis with destructions specially in the hips and knees. The bones contained very little chalk. The hip resembled exactly a *malum senilis*. The patient was according to size and development a fifteen-year-old girl and it was supposed that it was a case of hypophysal dwarfish growth, that the scarceness of chalk was due to this and that the former by reducing the resistance of the bones was the cause of this osteoarthritis which occurred at such an early age. [Author's Abstract.]

Stewart, Matthew J. THE HISTOGENESIS OF MYELOID SARCOMA. [Lancet, 1922, II, 1106.]

The author's view on myeloid sarcoma (myeloma, sarcome à myélopaxes) are based on a conception of bone as an intimate association of two distinct and well-differentiated tissues, (1) the osteoblastic and osseous tissue proper, from which osteosarcoma arises, and (2) the specialized fibrous tissue framework, which not only incloses and supports the bony tissue proper, but also provides the multinucleated osteoclasts whose function is bone absorption. Myeloid sarcoma, in this view, is a specific tumor of the fibrous tissue framework of bone, in which the polymorphous cell ground-work is the undifferentiated tissue, and the fibrous tissue and giant cells the differentiated end products of tumor growth. The giant cells correspond to the osteoclasts of normal bone, and are an integral and essential part of the tumor every whit as much as the latter are essential constituents of the normal tissue. They are neoplastic cells, not related to bony detritus, nor to other endogenous or exogenous foreign substances. On this hypothesis, *osteoclast sarcoma* would be the obvious name for the tumor, but until its true nature and histogenesis have been fully elucidated it would be well to adhere to the name "myeloid sarcoma" or "myeloid tumor" introduced nearly 70 years ago by Sir James Paget. About the neoplastic nature of the lesion there can be no doubt, and strong objections are offered to the theory propounded by Barrie that it is inflammatory: a chronic hemorrhagic osteomyelitis. Although there is still doubt as to whether the tumor ever undergoes metastasis, yet it exhibits definite local malignancy, and not infrequently recurs after removal. Local removal, by curettage or resection, must be performed in a very thorough and careful manner if it is to achieve justifiably successful results. [Author's Abstract.]

Regaud, C. THE SENSITIVENESS OF BONY TISSUE TO RADIATIONS AND THE MECHANISM OF OSTEO-RADIO-NECROSIS. [J. de radiol. et d'électrol., 1922, VI, 485. Med. Sc.]

The author points out how refractory bone is to X-rays, except under a few conditions such as growth and repair. As regards the vulnerability to radiations when invaded by an epithelioma, it is stated that most radiotherapeutists have mistaken the osteonecrosis which occurs after irradiation for an extension of the growth due to insufficient irradiation. In point of fact the continuation of growth and the osteonecrosis are entirely distinct.

Regaud maintains that normal adult compact bone is really much more radio-sensitive than the skin if it be traversed by primary radiations of very short wave-length. Four cases are quoted from which it is shown that bone certainly free from cancerous invasion undergoes radio-necrosis when it is only separated from the external air by a thin skin, and when an immediate and spontaneous or late and traumatic

ulceration puts it in communication with an infected center. The mechanism of this radio-necrosis is stated to be due to the calcium particles in the bone which act as centers of secondary radiation; thus the bone burns itself, the walls of its blood vessels, and the periosteum surrounding it. These modifications are latent and the bone behaves in a normal manner so long as it is protected from trauma, and above all from infection.

Lewin, P. JUVENILE DEFORMING METATARSOPHALANGEAL OSTEOCHONDritis. [J. A. M. A., July 21, 1923.]

The number of cases of juvenile deforming metatarsophalangeal osteochondritis reported to date is 63. The two cases here reported bring the total number to 65. The etiology of the condition is unknown. It occurs especially during adolescence. There is a uniform complaint of pain referred to the region of the affected metatarsal head. Swelling is usually present. It is due to exudate. No marked increase of joint tension is demonstrable. There is very marked, sharply circumscribed sensitiveness to pressure over the metatarsal head and the metatarsophalangeal joint. Abnormal local temperature is unusual. Definite limitation of motion with muscle spasm is present. Abscess formation has not occurred in the cases reported. To the roentgen ray goes the credit of recognition of this condition. It is here that a most interesting chapter is found. The findings are characteristic. They are: (1) flattening of the metatarsal head; (2) broadening of the neck and distal portion of the shaft; (3) irregularity of the epiphyseal line; (4) widening of the metatarsophalangeal joint space; (5) diminished cupping of articular surface of proximal phalanx, and (6) occasional line of incomplete fracture without displacement. The direct diagnosis is made on the history, local examination and roentgenograms.

The treatment consists of absolute relief of the affected foot from weight-bearing by means of crutches and a block under the heel and sole of the shoe of the opposite foot. The foot should be immobilized in a plaster cast with a small, beveled felt pad applied just back of the metatarsal heads. As the cast sets, pressure is applied laterally and toward the sole to build up the metatarsal arch. Phosphorized cod liver oil internally is of value. Fresh air, good hygiene and food hasten recovery. When all symptoms have disappeared, a proper shoe is prescribed. This should be a straight last, round toe, medium shank shoe into which is inserted a felt pad for the transverse arch. This may be applied by means of a resinous glue and tacks directly into the shoe, or sewed to the bottom of a leather insole. A metatarsal bar or anterior heel may be used, and the entire leather heel should be removed and a low rubber heel applied. A duralumin, or other metal plate made over a corrected plaster cast may be used temporarily. Physiotherapy, heliotherapy, hyperemia and hydrotherapy are indicated after the cast is removed. Baking, gentle massage and passive and active movements

with contrast baths hasten recovery. Special exercises for the metatarsal arch are performed over a round door stop screwed to a board. The patient sits, and with the door stop exerting pressure back of the metatarsal heads, the toes are forcibly flexed and extended. Picking up various sized marbles from a rug, using the bare toes, and pulling objects on the floor with the toes are auxiliary exercises.

Zadek, I. BLOOD AND BONE-MARROW FINDINGS DURING LIFE IN CRYPTO-GENETIC PERNICIOUS ANEMIA, ESPECIALLY DURING THE STAGE OF REMISSION. [Ztsch. f. klin. Med., 1922, XCV, 66.]

Zadek has undertaken a study of the bone marrow during life, together with examinations of the blood, in pernicious anemia. From his comparative studies of the blood and marrow, he arrives at the following conclusions: The characteristic macrocytosis, anisocytosis and hyperchromia, with megaloblasts, observed at the height of an Addisonian anemia, is the expression of a blood regeneration resulting from increased blood destruction; with this, there is a megaloblastic reaction of the bone marrow of the long bones. Close relations exist between the degree of the megaloblastic reaction of the marrow and the number of erythroblasts and macrocytes circulating in the blood. The increased blood destruction may be followed clinically at this stage by the golden-yellow color of the serum with bilirubinemia, by urobilinuria and, at autopsy, by siderosis of the liver. The periods of improvement which occur in most cases of Addisonian anemia are usually *stages of relative remission*, which are related, both clinically and hematologically, to the symptom complex, pernicious anemia, since the hemolysis at this stage of the disease is only slightly decreased, with no, or only few, evidences of regeneration of the blood. During relative remissions, the marrow of the long bones likewise reverts to a more normal state, and in place of red marrow, one finds a yellow marrow, which again becomes red during a recurrence of the disease. The remission is not the result of the megaloblastic marrow reaction, since macrocytes and erythroblasts disappear from both blood and marrow.

Duncan, J. H. NEUROPATHIC ARTHRITIS. [J. A. M. A., Dec. 9. 1922.]

A case is reported by the author to illustrate what happens to a joint when afferent nerves are destroyed. The patient complained of "rheumatism" in his right arm. He stated that in 1917 a log had fallen on his right shoulder while he was at work in the lumber woods. After recovering from the injury, he had been able to work, but at intervals he was forced to lay off with this so-called rheumatism. The arm was swollen from the hand to the shoulder, markedly so over the wrist, in front of the shoulder and over the lower part of the scapula. The appearance of the wrist suggested the dinner-fork deformity of Colles' fracture. He could move this swollen wrist and all the other joints without making the least complaint, and he could do the same

thing actively without any apparent discomfort. The swelling anterior to the shoulder joint was fluctuant, and suggested a hydrarthrosis. The glands were enlarged and easily palpable in the axilla. The next thing which aroused interest was the discovery of complete anesthesia in the skin of the right arm from the fingers to the shoulder and over an area which may be called right pectoral and right scapular on the trunk. Several roentgenograms were taken. That of the right shoulder showed only a separation of the articular surface, and it was concluded that this was due to fluid in the joint. One of the right elbow revealed almost a normal condition, with a slight exostosis from the head of the radius. The findings in the wrist were a complete disorganization of the carpus. The two rows seemed crowded together, as if compressed between the bones of the forearm and the metacarpals, and part of the scaphoid seemed to be squeezed out of its normal relations and was found lying external to the radius. The distal ends of the radius and ulna were hypertrophied, and the periosteum of each showed bone formation. The base of the fifth metacarpal had a worm-eaten appearance. Considering the clinical and roentgenographic appearance of this joint, the increased density with the absence of pain, the associated area of anesthesia and the history of injury, a diagnosis of neuropathic arthritis was made.

Pemberton, R. ARTHRITIS, PSYCHOPATHOLOGY AND METABOLISM. [Am. Arch. Neur. and Psych., Feb., 1923.]

An interesting analysis of 1,000 cases of arthritis in which the need for as comprehensive a knowledge of psychopathology as of chemistry is shown. When the psychopathologist knows his chemistry and the chemist his psychopathology some useful results will obtain and not before. At the present time it may in general be stated that the average neurologist is better acquainted with chemistry than is the average metabolist with neurology.

Deusch, G. POLYARTHRITIS CHRONICA DEFORMANS PROGRESSIVA AND BASEDOW'S DISEASE. [Kl. Wochenschr., 1922, No. 44.]

The writer concludes that this disease of the joints has an etiological basis in functional disturbance of the thyroid and certainly in that of other endocrinous organs. The case upon which he bases his conclusions is that of a thirty-seven-year-old woman with late appearance of the menses in whom the first symptoms of the joint disease appeared at the time of the most severe Basedowian symptoms.

Chick, H., Dalyell, E. J., Hume, M., Mackay, H. M. M., and Smith, H. H. ETIOLOGY OF RICKETS IN INFANT. [Lancet, July 1, 1922, Vol. II, No. 5157, p. 7, J. A. M. A.]

The observations on the etiology of rickets reported on by Chick et al. disclosed that rickets developed during winter and spring under

excellent hygienic conditions in infants receiving a diet composed of fresh milk from stall-fed cows and to which sugar was added, and was prevented in the case of children receiving a diet containing codliver oil, more milk, and less carbohydrate. Both milks were low in vitamin A content. Rickets did not develop in summer on either diet. Rickets can be cured by codliver oil and by exposure to sunlight, or to the radiation of the mercury vapor quartz lamp. The first six months of life is a period of special susceptibility to the onset of the disease. Rickets may develop in an infant whose general condition is good or improving, and healing of the bones may occur independently of improvement in the general condition.

Grafe, E. MUSCLE TONUS. ALTERATIONS OF TONUS AND GENERAL METABOLISM. [Arch. f. klin. Med., Vol. CXXXIX, Nos. 3, 4.]

The writer has not been able to observe with certainty increase in metabolism as a result of marked changes in tonus such as are present in tetanus, encephalitis and a number of other organic nervous diseases. Alterations of tonus of other origin such as correspond to the catatonic tensions do not appear to have any effect upon the general production of heat of the organism, but one must also consider here the failure of external activity. It cannot however be determined for the present at what measure of activity increase in metabolism begins. Even though when there is increase in tonus the increase in muscle metabolism keeps pace with the action streams this is not to be measured as is the increase in voluntary muscular contraction. In fact it is so slight that it could not be discerned in the metabolism of the entire organism. Therefore one is not yet in a position to decide whether in increase of tonus there exists an essentially different form of muscular excitement than that depending on the voluntary innervation or not.

Gordon, Alfred. A CASE OF PARAMYOTONIA. [Transactions of Phila. Neurol. Soc., Nov. 24, 1922.]

Patient exhibited the classical myotonia of which Thomsen's disease is an example and presents variations as to the onset, distribution, etiology, and mechanical irritability. The chief characteristic symptoms are: Sudden rigidity of the muscles upon attempts to move them, increased mechanical irritability and finally special electrical reactions. A galvanic current will produce a wave-like contraction of the muscles running from the cathode to the anode, also gradual relaxation. Each of these characteristics may vary in intensity. Eulenberg and others describe a variety called paramyotonia. Here the muscular spasm occurs not upon motion, but upon exposure to cold. Besides, the electrical reaction with Erb's formula may be entirely wanting. In other varieties of myotonia there has been a different distribution of the muscular spasms. Myotonic contracts of the muscles of the face have been mentioned by writers, but always in association of the body.

The following case is an example of paramyotonia in which the spasm is confined exclusively to the muscles surrounding the orbits and especially to the eyelids.

H. P., male, fifty-two years of age, after a prolonged mental distress of a domestic character developed a myotonic contraction of the muscles surrounding the base of the nose and of the orbicularis palpebrarum. Suddenly without an apparent cause, but often upon the appearance of a bright light the muscles around the orbits would contract intensely and the eyes would close tightly. No effort on his or on anyone else's part would succeed in opening the eyes. The condition would remain as such for many minutes, and relaxation of the muscles would take place rapidly but not suddenly. The patient learned how to shorten an attack: He would succeed in it either by a certain turn of his head or by blowing his nose.

After a period of treatment with intensive doses of strychnia the spasm of all other muscles disappeared, but the tonic contractions of the eyelids remain. Mechanical irritability is increased. Test with electrical currents, galvanic and faradic, gives a very prompt response to both currents, but at no time was there the classical myotonic reaction of Erb.

Further examination of the patient reveals nothing abnormal with the exception of greatly increased knee jerks. There are no other abnormal reflexes. The sensory apparatus, gait, station, cranial nerves, sphincters are all normal. There is no tremor, no ataxia. Pupils react to light and the eyegrounds are intact. Urinalysis, Wasserman test of the blood are negative. The patient does not use alcoholic beverages. His personal and family histories are all negative.

The interesting points in this case are: Absence of myotonic reactions, absence of any special etiological factor immediately preceding an attack; the limitation of the spasm to the muscles of the eyelids which makes this case unique, since in the records of the literature the facial muscles were invariably involved together with other muscles of the body. [Author's Abstract.]

Uyeno, K. ON THE RELATION OF THE SYMPATHETIC TO MUSCLE TONE.
[J. Physiol., 1922, LVI, xliii.]

Dusser de Barenne and others have shown that decerebrate rigidity is unaffected by depriving the muscles of their sympathetic supply. Whether stimulation of the sympathetic will increase the rigidity has not been investigated. Therefore Uyeno has tried the effect of stimulating the stellate ganglion and of applying nicotine to it. He finds that neither stimulation of this ganglion nor its paralysis by nicotine has any appreciable effect upon decerebrate rigidity. [Walshe, Med. Sc.]

II. SENSORI-MOTOR NEUROLOGY.

8. NEUROSYPHILIS.

de Schweinitz, G. E. OCULAR SYMPTOMS IN HYPOPHYSIAL DISEASE WITH ACQUIRED SYPHILIS. [Archives of Ophthalmology, May, 1921. L, No. 3. J. A. M. A.]

None of the ocular symptoms depending on pituitary body disease, de Schweinitz says, is of itself characteristic of acquired syphilis, and these symptoms, therefore, do not differ from those exhibited by patients who are not syphilitic. It is possible, even probable, that a careful analysis of cases of pituitary body disorders, with exterior ocular muscle palsies, would show a greater incidence of such paralyses in syphilitic subjects, especially in secondary involvements from bony or dural syphilis. Naturally, if a patient with acquired syphilis develops the symptoms of hypophyseal disease, active specific treatment should, and would, be instituted. If in such circumstances the gland itself is not either primarily or secondarily syphilitic, the ocular signs of pituitary body involvement would not yield, and surgical interference is indicated. If the gland is the seat of syphilis, being gummatous, for instance, a freely employed specific treatment may result in satisfactory and even brilliant results. All patients, therefore, with pituitary body disorder, who also have constitutional syphilis, or from whom the suspicion of such an infection cannot be eliminated, should have the advantage of a full trial of this therapeutic test. In stages of glandular insufficiency the efficacy of organotherapy is probably enhanced by simultaneous administration of mercury (preferably by inunctions) and the gland extracts, even though the presence of syphilis is not demonstrable by the usual methods. De Schweinitz suggests the probability that a combination of thyroid and pituitary gland extracts is more efficient than either of the extracts alone, and that this combination, associated with mercury, is more effective than is an extract of one gland, even though given in conjunction with unguentum hydrargyrum.

Kaufman, I. THE MYELINIZATION OF THE POSTERIOR COLUMN OF THE CORD. [Ztschr. f. d. ges. Neurol. u. Psychiat., 1921, LXVII, 190.]

Richter, H. ESSENTIAL LESION OF TABES. [Ztschr. f. d. ges. Neurol. u. Psychiat., 1921, LXVII, 1.]

Schaffer, K. HISTOPATHOLOGY OF TABES. [Ztschr. f. d. ges. Neurol. u. Psychiat., 1921, LXVII, 222.]

In this important series of papers from the laboratory of Karl Schaffer are recorded and discussed a series of very significant conclusions on the origin and nature of the essential lesion of tabes. The anatomical and pathological basis of these conclusions is provided by the observations of Kaufman on the mode of myelinization of the posterior roots and columns of the cord, which are then correlated with the pathological

findings of Richter and Schaffer. Kaufman does not agree with the views of Flechsig on the myelinization of the posterior columns, but her observations conform closely to those of O. Vogt on the myelinization of the cerebral hemisphere and with some observations of Brodman on the cord. Flechsig divided the posterior columns into four zones: anterior, middle, postero-mesial, and postero-lateral zones, each of which formed a territory with its own myelinization period. Kaufman finds that the posterior columns are myelinated later than the antero-lateral columns and the posterior roots later than the anterior roots. The posterior columns in a four-months' foetus are nonmyelinated. Myelinization first appears in Flechsig's middle zone, which corresponds to the root-entry zone. From this it spreads slowly throughout the column, and the only differentiation permissible is into early and late myelinated areas. The former corresponds with the root-entry zone, the latter with the postero-mesial zone of Flechsig, or the area of Goll's column. The short and medium length fibers first gain their myelin sheaths, the long ascending fibers of the column do so later. Schaffer points out that the root-entry zone is particularly rich in posterior root fibers, and contains short, medium, and long fibers; indeed all the posterior root fibers of a given segment. Hence it is not surprising that myelinization should appear particularly rich here, and its intensity depends upon the early myelinization of short and medium fibers. Therefore, the short and long fibers of the columns differ not only topographically, but also biologically, as the myelinization processes indicate. Degeneration of posterior root fibers follows identical laws, the short and medium fibers which lie thick in the root-entry zone and never pass into the postero-mesial zone always degenerate earlier than the long fibers of the latter zone. Hence the distribution of the posterior column degeneration seen in tabes is by no means specific for this disease, cannot be described as selective, but depends upon the anatomical distribution and the biological characters of these two groups of fibers.

Richter, from the serial examination of the posterior roots of fourteen cases of pure tabes and ten of tabo-paralysis, finds that *the essential lesion of tabes* consists in a peculiar form of granulation tissue which develops primarily in the sheaths of the posterior roots, whence it spreads secondarily into the roots (peri-fascicular and then endo-fascicular spread), and causes them to degenerate. The essential cell of this tissue is described as a fibroblast, which develops in the endothelial lining of the lymph channels and in the connective tissue spaces of the arachnoid and dural sheaths. The granulation tissue thus formed tends, like granulation tissues in general, to become sclerotic ultimately. The nerve degeneration secondarily produced is focal and of irregular distribution and intensity. Thus some roots are but slightly degenerated, others completely. Nor is the process at all symmetrical. Commonly, the short and medium fibers of the roots are the first to suffer, and upon this fact depends the distribution of the purely secondary posterior column degen-

eration. In pure cases no other lesion is found, nor is there any meningitis in the common sense of the term. No lymphocytes or plasma cells are found in the lesion, except in cases of tabo-paralysis, where they are found in addition to the lesion already described. Spirochetes are of common occurrence in this essential tabetic lesion, and hence its syphilitic origin is clear. The lesion may be found in all grades of development, intensity, and extent in cases of tabes.

These findings, as Schaffer points out, are directly against the view that the essential lesion of the disease is a primary selective degeneration of certain fibers in the posterior columns. They point to the fact that the nerve lesion is secondary, and depends for its prolongation into the cord and its distribution there to well-established anatomical facts. Tabes, therefore, depends upon the local presence and growth of spirochetes in the sheaths of the posterior roots and upon the chronic granuloma resulting from their action on the tissues, the nervous lesion being purely secondary.

These papers are very lengthy and occupy over two hundred pages of the journal. An adequate abstract is, therefore, not easy within a short compass, and the papers should be consulted in the original by those interested. That they are of great importance is clear. [F. M. R. WALSHE, Med. Science.]

Hagelstam, J. SYPHILIS OF THE CENTRAL NERVOUS SYSTEM. [Finska Läk. Hand., May-June, 1921, LXIII, No. 5-6. J. A. M. A.]

Hagelstam compares the various theories in regard to the pathogenesis, etc., of neurosyphilis, his article being one of the principal addresses at the recent Scandinavian Internal Medicine Congress mentioned in the Helsingfors Letter. He here comments on the frequent intensity of the meningeal reaction to the syphilis; in one of his cases a man of twenty-two, previously healthy, had had a urethral discharge for two months. During the last three weeks there had been severe headache, most intense in the night and toward morning, with dizziness when he tried to sit up, and he vomited everything he ate. The neck was not stiff and the reflexes were normal. Numerous small hard glands could be palpated in the groin and back of the neck. The Wassermann test was negative but lymphocytes were numerous in the lumbar puncture fluid which was under high pressure. No benefit was derived from antipyrin or caffeine but all the symptoms subsided under potassium iodid. He was given later a course of inunctions and has had no return of symptoms during the seven years to date. Syphilitic meningitis generally runs an afebrile course, but one young woman developed meningitic symptoms and a remittent fever under mercurial treatment, both persisting in spite of energetic mercurial treatment until a change to arsphenamin finally brought about a cure. Hagelstam has not been able to find but one other case on record in which meningeal symptoms developed in the course of mercurial treatment, and in a recent trip to Germany could not learn of any instance of recurring

neurosyphilis in connection with mercurial treatment. This makes it the more remarkable that in his own 121 cases of cerebral and cerebrospinal syphilis, since 1913, in twenty-six the first symptoms of it had developed during or at most within six weeks after the close of the course of specific mercurial treatment, sometimes plus one or two injections of neoarsphenamin. He says that the alleged nonexistence of tabes and general paresis in Turkey has been disproved by Fleischmann's experience during two and a half years there during the war. War conditions modified the customs so that the foreign physicians were not kept at such a distance. Previously it had been considered a religious duty to keep the mentally sick away from the infidel physicians. A Japanese reported at the recent neurological congress at Paris a somewhat similar experience. Hagelstam quoted Catsaras to the effect that a congenital or acquired nervous predisposition can be detected in every instance of the neurotropic manifestations of syphilis. Stern has reported that 50 per cent of all his patients with tabes or general paresis were of the *asthenia universalis* type, and a further 35 per cent showed abnormal thyroid functioning. General paresis seemed to affect preferably the thyroid insufficiency cases.

Montgomery, Douglass W. CONCERNING THE PRE-COLUMBIAN EXISTENCE OF SYPHILIS IN EUROPE. [*American Journal of Syphilis*, October, 1921, I, No. 4.]

Attention is drawn in this article both to wilful and to careless historical mistakes. The subject matter involves a mistake made the better to fit the requirements of a racily running and very amusing epitaph in verse by Rabelais, the foremost writer of his day, and at the same time, a learned physician in active practice. The epitaph states that the good churchman, the subject of the epitaph, died of syphilis in the year one thousand four hundred twenty, or as Rabelais has it:

"Et fut l' an mil quatre cens vingt
De la verole qui lui vint."

As Rabelais lived at the time of the discovery of America, and as he was a physician who took a very especial interest in lues, any statement by him that a man died of that disease in the year 1420, and, therefore, seventy-two years before the discovery of America, should carry great weight. The learned commentators of Rabelais, however, Esmangart and Johanneau, have shown that Rabelais changed the date of a caustic old epitaph written by Marot on a monk, a native of Orleans named Brother John l'Évêque, and that this epitaph states that the good Brother died in the year 1520. This indicates quite a different chronology, and shows that Rabelais in inditing his epitaph was writing literature, not history. Many an historian, austere, Wilsonian and single-minded has had his facts twisted by his more delightful, light-hearted brother, the litterateur, and the above is only one example of many misstatements made in regard to the preColumbian existence of syphilis in Europe. The arguments, however, both general and particular, in favor of the

American origin of syphilis are altogether too strong to be explained away by occasional individual historical assertions which are so liable to error. [Author's abstract.]

Berkeley-Hill, O. WASSERMANN SURVEY OF INMATES. [Indian Med. Gazette, March, 1921, LVI, No. 3. J. A. M. A.]

The entire population of the Ranchi European Lunatic Asylum, which is fairly representative of the "middle" or "lower-middle" class European and Eurasian population of Northern, Central and Eastern India, has been examined by Hill by the Wassermann syphilis reaction, 186 individuals being tested. None of these were general paretics. Of the total number, seventy-three reacted positively, on which basis there is a percentage of latent syphilis amounting to 39.24 among the total population of the asylum. Hammond, in his survey of the New Jersey State Hospital, in which he examined 1,583 individuals, found that on excluding cases of general paralysis the percentage of latent syphilis in the total hospital population was only 2.7. It is believed that the enormous difference between the percentage of syphilitics in the Ranchi Asylum and in the New Jersey State Hospital can be explained as being due to (1) the comparatively few cases examined, (2) that the cases examined had never received any anti-syphilitic treatment since admission to the asylum, (3) that they were all drawn from an urban population as opposed to the rural population which supplies the cases to the New Jersey State Hospital, (4) that the middle class Europeans and Eurasians in the towns of Northern, Central and Eastern India are as a community very heavily infected with syphilis, a view that finds considerable support from the huge percentage of unmarried women belonging to the community who are found to be suffering from syphilis.

Urechia and Josephi. GLYCOSURIA IN NEUROSYPHILIS. [Annales de Médecine, February, 1921, IX, No. 2.]

Neurosyphilis as causative of a glycosuria is here reported upon in ten cases out of their total of 100. The glycosuria was mild and intermittent but the pupils and lumbar puncture fluid testified to the neurosyphilis. The glycosuria vanished under antisyphilitic treatment.

Brock. NEUROSYPHILIS. [Med. Klin., January 22, 1922, XVIII, No. 4. J. A. M. A.]

Brock gives the details of forty-two cases of neurosyphilis under repeated control of the cerebrospinal fluid for years. The fluid findings returned to normal in one case, with symptoms of spinal meningitis at the posterior roots, under a total course of 4.15 gm. silver salvarsan and sixteen mercurial injections, but, after transient improvement in the clinical picture, symptoms of tabes developed. In such cases treatment had better be with small doses of the arsphenamin, possibly with shorter intervals, to avoid irritating further the spinal tracts already tending to degeneration.

III. SYMBOLIC NEUROLOGY.

2. EPILEPTIC STATES.

Stier, A. NARCOLEPSIES IN CHILDREN. PYCNOLEPSY. [Zschr. f. d. ges. Neur. u. Psych., Vol. LXXX, Nos. 1-4.]

Stier describes children who have suffered frequent light attacks whom he has observed through seventeen years of experience. Of these 7 without doubt gave the picture of narcoleptic absences described by Friedmann and with absolutely favorable prognosis. Stier names this condition pycnolepsy. The children affected were from four to twelve years of age. No evidence of alcoholism, epilepsy, or mental disease in the inheritance. Spasmophilia, affect convulsions, convulsions specially occasioned may have been present. The attacks themselves begin explosively, continue without interruption and usually cease suddenly. They may continue even after puberty. The symptoms which manifest themselves chiefly in a brief inhibition of the higher psychic functions are very monotonous. Involuntary micturition, fixed pupils, very slight motor symptoms may be present. Deep loss of consciousness, true convulsions, attack in sleep, susceptibility to luminal have no place here. [J.]

Hartenberg, P. EPILEPTIC ATTACKS DUE TO CEREBRAL INHIBITIONS. [Presse Méd., Dec. 23, 1922, XXX, No. 102.]

Hartenberg attributes severe epileptic attacks to an inhibition of cortical centers, and not to excitation. He considers minor attacks and epileptic equivalents from the same point of view.

Frisch, F.; Walter, K.; Weinberger, W. INVESTIGATIONS IN PERIODIC EPILEPSY. [Zschr. f. d. ges. Neur. u. Psych., LXXIX.]

The writers publish two reports of their investigations in a series of cases. They find even preapoxysmal: Increase of nitrogen residue for days before the attack, increase of blood sugar and a corresponding increase in electrical stimulability. Investigation of changes in body weight and of the sodium chlorid and calcium metabolism reveal that the attack is preceded by diminution of sodium chlorid in the blood with increase of calcium while equilibrium is again attained after the attack. Body weight fluctuates with the amount of sodium chlorid. The disturbances are extrarenal in origin. All of these investigations need to be made far more extensively.

Humes, C. D. SUGAR IN CEREBROSPINAL FLUID IN EPILEPSY. [Ind. St. Med. Assn. Jl., March, 1923, XVI, 3. J. A. M. A.]

Humes has noted that there was an absence of Fehling's reduction in the nonconvalescent state of epilepsy. This suggests to him the possibility that the cerebrospinal fluid has a physiologic as well as a mechanical function. The following questions are under investigation now: If

the cerebrospinal fluid is to be considered a filtrate, why is there not a more consistent relation between the quantity of sugar in the blood and spinal fluid? Is there a distinct cerebral metabolism? If normal cerebrospinal fluid carries glucose as a natural constituent, what is the significance of its persistent absence in the nonconvulsive stage of epilepsy? What is the quantitative relation between sugar in spinal fluid and blood, in health? A further report is promised.

Fischer, Herman. EPILEPSY AND THE ADRENAL GLAND. [Ann. of Surg., Aug., 1922. Aust. M. J.]

Herman Fischer reports some cases of extirpation of one (left) adrenal gland for the cure of epilepsy. This operation is a practical application of the theory that reduction of adrenal substance in the animal body lessens the tendency to convulsions. The adrenal was approached through a left lumbar incision, such as is usually made in kidney operations, the last rib being resected. After the exposure of the perirenal fat, the kidney was carefully pulled down till its upper pole was exposed and the adrenal sought for, its vessels ligated and the organ removed. Owing to its inaccessibility, the right gland is but rarely removed. The first of the author's patients to be treated by operation was a man, aged twenty-five years, who had suffered from epileptic attacks for sixteen years. Double subtemporal decompression had been performed without any relief. After the removal of the adrenal gland the patient seemed much better for some days, but about three weeks after the operation the convulsions returned, the patient having as many as seven in one day. This continued for some months, but the fits became less frequent and weeks elapsed without any.

McCartney, J. TREATMENT OF EPILEPSY. [Br. Med. J., Jan. 6, 1923, I, No. 3236.]

In this clinical therapeutic report the results of treatment of 18 patients are considered. The best results were obtained, he believes, with potassium bromid, 15 gr.; borax, $7\frac{1}{2}$ gr.; liquor potass. arsen., 2 m.; three times daily. The improvements noted were: (1) mental; (2) freedom from stupor following the convulsions; (3) irritability and quarrelsomeness diminished; (4) change of habits quite marked.

Ganter, R. THICKNESS AND WEIGHT OF THE CRANIAL VAULT IN EPILEPTICS AND THE MENTALLY DEFECTIVE. [Arch. f. Psych. u. Nervkr., 1922, LXVII, No. 1.]

Ganter gives the results of examination of the cranial vault of 166 epileptics and 110 mental defectives. The greater number of cases showed a thickness of 5-6 mm. In epileptics a thick vault, 7 mm. and more, was found almost twice as frequently as in the mentally defective so that there would seem to be a connection between epilepsy and thick skull. The vault is more likely to be thick where there is small con-

tent than where there is greater content. Where there was difference between the left and right half of the skull the greater thickness of the former was twice as frequent as that of the latter. In some cases the thick and thin portions were very irregularly distributed. In some cases where porencephalus, interference of development of half the brain or other brain process was present the skull was thicker on the side affected, apparently a compensatory process or filling out of space. The frontal bone showed a striking thickness and compactness where there was a low, receding forehead. The pure compactness of the skull was predominant in epileptics while in the mentally defective there existed equally the solidly compact skulls or those with compact tissue and diploe. Caput eburneum was found in epileptics alone. The weight in most cases varied within wide limits about 300 g. Epileptics more frequently had heavy fornices. A case of trauma and epilepsy showed the greatest weight, 750 g. Four cases revealed unmistakable connection between compactness of the cranial vault and sclerosis of the brain. [J.]

Muskens, L. J. J. MYOCLONIC REFLEXES AS BASIS FOR EPILEPTIC MYOCLONUS. [Ned. Tijds. v. Genees., Feb. 17, 1923, I, No. 7.]

This author has been conducting a series of experiments in lower animals. This is his second report with cats. Myoclonic and localized spasms which apparently resemble similar epileptic, myoclonic and regional convulsions in man can be induced in these animals. Camphor bromid and absinthe are used. By this means a simple and easy method for physiologic research on epilepsy is obtained, he argues.

Marchand and Adam. FATAL EPILEPTIC ETAT DE MAL AFTER OVARECTOMY. [Bul. d. l. Soc. Méd. d. Hôp., Feb. 2, 1923.]

This woman, aged sixty, had had goiter of ten years' standing, and her uterus and ovaries had been removed for fibroids. The first epileptic attack occurred three months after the hysterectomy and ovariectomy. She died in status epilepticus two months later. Necropsy showed arteriosclerosis of the brain and a hemorrhage in the middle of the anterior pituitary.

Kahler, H. NARCOLEPSY. [Jl. f. Psych. u. Neur., XL, Nos. 2, 3.]

The author reports an abnormal cerebral exhaustion, a narcoleptic reaction resting upon a constitutional basis. Apparently the blood glands are of great importance in the appearance of the condition.

Ashmore, B. L. COMPARATIVE LUMINAL, BROMID, DIET AND ELIMINATIVE TREATMENT OF EPILEPSY. [Bost. Med. & Surg. Jl., Dec. 28, 1922, CLXXXVII, No. 26. J. A. M. A.]

A group of fifty male patients, varying in age from nineteen years to sixty-six years, with an average age of forty-one and one-tenth years, and duration of epilepsy ranging from three and one-half years to fifty-

eight years preceding treatment, with an average of twenty years during which seizures have taken place in the thirty-seven cases, having reference to the time when seizures were first noted, were placed under this drug and diet treatment by Ashmore for six months. In cases of both phenobarbital and the bromids, active treatment periods completed, the seizures were more nearly controlled with the former drug. From the standpoint of numbers and oftentimes in regard to severity, cases of idiopathic origin were more responsive. The diet and elimination treatment group obtains last place on the list, but this treatment is very important, either alone or in conjunction with other recognized methods of treatment. No particular laxative or cathartic appeared to be superior in effect to others during this period. Special care to avoid autointoxication in one group played a very important rôle in the reduction of seizures obtained. Beneficial effects were noted in all groups during posttreatment observation period.

Patterson, H. A. HEMATOLOGIC PICTURES IN ENDOCRINE SYNDROMES FOUND ASSOCIATED WITH EPILEPSY. [Am. Jl. of Psych., Jan., 1923, II, No. 3.]

This observer, pathologist at Craig Colony for Epileptics, reports upon 128 cases of epilepsy presenting some endocrine disturbance. The majority showed pituitary dysfunction. The leukocytic formula in all these disorders is either distorted or masked by the hyperleukocytosis which accompanies the epileptic state.

Stuurman, E. J. BROMIDES AND LUMINAL IN THE TREATMENT OF EPILEPSY. [Ned. Tijds. v. Gen., Feb. 3, 1923, p. 442.]

E. J. Stuurman discusses the relative advantages of bromides and luminal in the treatment of epilepsy, and comes to the conclusion that luminal is as effective as bromides in reducing the number of fits sufficiently to render the patient's life tolerable. Perhaps it may be said that luminal is even more effective, but not to such an extent as to justify the much greater expense which would be caused by its administration on a large scale, luminal costing more than twenty times as much as bromides. Luminal, however, is especially indicated in the status epilepticus and in cases which do not react to bromides alone. In such cases the combination of luminal with bromides may be of service.

Demole, V. ALCOHOLIC EPILEPSY. [Rev. Méd. de la Suisse Romande, June, 1922, p. 337.]

The frequency of alcoholic epilepsy in Switzerland before and after the entry into force of the law of January, 1909, prohibiting the sale of absinthe is here recorded. Before 1909, 30 per cent of the alcoholics admitted for institution treatment suffered from alcoholic epilepsy, whereas since 1909 only 18 per cent of the cases admitted showed epileptic crises. The suppression of the sale of absinthe has also

lessened the violence of the alcoholic inmates, doctors and attendants being unanimous in declaring that since the abolition of the "*fée verte*" the average delirious patient has been less excited and aggressive. The total admissions for alcoholism have been slightly reduced, but such statistics are hardly comparable from year to year, because of war and post-war conditions. The author states that alcoholic delirium would diminish more and more if the consumption of distilled alcoholic beverages were reduced, since alcoholic epilepsy is very rare in communities which drink only beer and wine. The introduction of the law suppressing absinthe has been responsible for the saving of more than a quarter of a million francs in the expenses required for the restraint of alcoholic patients in Switzerland.

Baylac, Bize, and Stillmunkes. POLYNUCLEOSIS OF SPINAL FLUID IN EPILEPTIC. [Bul. d. l. Soc. Méd. d. Hôp., Feb. 2, 1923.]

An increase in polynuclears in the cerebrospinal fluid during epileptic status was observed by these authors. The patient had also a marked hemoclastic crisis. Epilepsy is perhaps of anaphylactic nature, they argue.

Cristel, G. CONTINUOUS JACKSONIAN EPILEPSY. [Riforma Medica, XXXVIII, No. 25, p. 577.]

This unusual history of a young woman who had had epileptic convulsions in the right arm for twenty-two years. This had seemed to result from a fall on head and resisted all forms of treatment. The spasms had the rapidity of a convulsive tic, while the arm movements were suggestive of chorea. An uncle had died in status epilepticus and a sister has typical epileptic seizures. The rolandic region was opened up but nothing pathologic was found except that the dura was a little thicker than usual, and pulsating. Hemiplegia followed the operation, but this subsided in a few days and the epilepsy returned.

Demole, D. V. TREATMENT OF EPILEPSY. [Arch. Suisses de Neur. et Psych., XI, No. 2.]

The author gives an extended review of the results obtained by protein therapy, syphilotherapy, surgery, sedatives, psychotherapy and endocrinology. He prefers treatment by salt reduction and bromides, particularly making use of sedebrol. Dyspepsia, acne, etc., are exceptional. In status states, commifene (Roche) in subcutaneous or intravenous injection has been of great service. [Author's abstract.]

Burr, C. W. HEREDITY IN EPILEPSY: STUDY OF ONE THOUSAND FOUR HUNDRED AND FORTY-NINE CASES. [Am. Archives of Neurology and Psychiatry, VII, No. 6, p. 721. J. A. M. A.]

Burr's statistics do not show that direct inheritance is important, since only thirty-four parents were known to be affected. On the other

hand, the frequency of insanity, crime, chorea, alcoholism, and epilepsy in relatives points towards congenital instability resulting from abnormality in the germ cell or sperm cell. Considering all the data, it is safe to assume, Burr says, that the effect of heredity is rarely direct; that usually it is indirect and general, not specific. In other words, a predisposition to nervous or mental disease is inherited; the resulting specific disease depends on external causes—it is environmental in the broadest meaning of the word.

Thom, D. A. and Walker, G. S. EPILEPSY IN OFFSPRING OF EPILEPTICS. [American Journal of Psychiatry, I, No. 4, p. 613.]

These observers arrive at the conclusion that epilepsy, as such, does not exist and is by no means entitled to the classification of a disease entity, a position which is taken by nearly all epileptologists of recent years. The symptom complex which goes to make up the condition which has borne the name of epilepsy is not constant nor is it characteristic. The convulsions caused by lesions of the kidney are quite indistinguishable from those produced by an acute infection. In neither case, may they differ from the group called idiopathic epilepsy. A high percentage of the autopsied cases show gross brain lesions. Many of these have been diagnosed as idiopathic epilepsy. One hundred and seventeen cases are analyzed in detail. The diagnosis of epilepsy had been determined in all these cases. The subjects had all been married and had borne one or more living children. The total number of children resulting from these 117 matings was 431, of which 280 are still living. Of the parents seventy-six were females; forty-one males. Ninety-nine cases were idiopathic; eighteen organic. The onset of the convulsions began in fifty-nine cases prior to marriage and in fifty-eight cases after marriage. Of the total of 117 epileptic parents only twenty-two gave birth to epileptic children. Thom and Walker believe that epilepsy as a disease is not transmitted directly from parent to offspring, but rather that it is the nervous system lacking in the normal stability that is inherited, and the manifestations of this instability may be mental deficiency of all degrees, insanity of various types, neurologic and psychopathic disorders, convulsions from various exciting causes, which would have little or no effect on a normally developed nervous system. These mental and nervous disorders are less frequently found in the offspring of the so-called epileptic than has heretofore been believed and the future of the offspring born to epileptic parents is not as hopeless as the pessimistic authorities on heredity record. Maternal defects are more frequently manifested in some form or other in the offspring than are the paternal defects and, when present, are more likely to appear at an earlier age.

BOOK REVIEWS

Wittels, Fritz. SIGMUND FREUD. DER MANN, DIE LEHRE, DIE SCHULE. [E. P. Tal & Co. Verlag, Leipzig, Wien, Zurich.]

"'Tis with men's judgments, as their watches—None go just alike, yet each believes his own."

So goes an oft-quoted phrase, and many a criticism and appreciation has little more foundation.

In the present instance we think we find a little more. Here is something that goes a little deeper, and if we are not misinformed, this is the first general appreciation of Freud's personality which has been published. As such it merits attention, perhaps as telling us something of Freud, maybe as more interpretative of Wittels. Of the former we know much, *i.e.*, of his scientific formulations, of the latter little, save that he was one of the earlier members of the Freudian group in Vienna and one of those who separated himself from the nucleus of admirers, and here would either justify his position or seek to comfort his soul for his act of independence. True, he speaks of "hypnotisierter Ja sager" from the which he would absolve himself, and yet, as we read between the lines we are not certain that he would have really preferred to have remained more faithful to the master.

As to the substance of this presentation one can find an excellent sketch of the flotsam and jetsam, and much of the main current of the psychoanalytic movement most interestingly portrayed. Here, moreover, one finds much interesting and even valuable historical and psychological data of the early life of Freud himself, and not unsympathetically outlined. Even if the Anglo-Saxon reader has repressed much of his "sentimental" inheritance and finds it a bit "thick" Wittels' opening sketch of Freud's early life is not without considerable emotional interest. The early "cocaine-Koller" situation is all too hastily outlined.

The story of Freud's study period with Charcot and Bernheim is full of interest as is also his contact with Breur. We miss, however, a period of his interests in zoölogy and neurology, for Wittels proceeds directly to the outlining of Freud's conceptions of the psychoneuroses, Chapter IV, the "Anxiety Neuroses," the outlining of which Wittels would assume would not have been possible had not both Brücke and Meynert, who were Freud's most admired teachers, died. Had not these contacts with eminently structural concepts been severed Freud's functional evolution might have been delayed. Charcot died in 1893 and Freud's father in 1896, and then came the "Traumdeutung," according to Wittels, as a consequence. May be? But the reviewer is noncommittal.

Then follows the many intricate ins and outs of his admirers and his antagonists, the recital of which must be left to the reader of this most interesting book, as it winds through the maze of the development of the Psychology of the Unconscious which has meant so much for present-day psychology and psychiatry.

We feel that comment is superfluous and judgment unnecessary. The book is of much interest and is but the forerunner of other portrayals of one of the outstanding figures of modern medicine. It should be translated. [Has been. See review later.]

Jones, Ernest. *ESSAYS IN APPLIED PSYCHO-ANALYSIS.* The International Psycho-analytical Library, No. 5. [The International Psycho-Analytical Press, London and Vienna.]

Neither the writer of this book nor its contents need special introduction. Jones has long proved himself a clear-thinking investigator into the unconscious motivation which underlies religion, literature, art, the superstitions which bind man, and the political passions that sway him. All these things come under review in the essays which Jones has here brought together, many of them, at least, from earlier scattered publication.

Jones is not only fearlessly direct in his affirmation of the most concrete infantile factors which operate underneath even the highest esthetic or "spiritual" products of mankind. His sincerity as an investigator clothes these facts with a value which no one can pass by, no one who truly seeks to know human nature in order that it may be aided to the "supersession of the pleasure-principle by the reality principle." One may be offended at first by the thought that the Immaculate Conception, elaborated throughout the centuries, is but an outgrowth of the crudest infantile theories of procreation and birth. Jones has supported his contentions by much material drawn from the religious and artistic records of these centuries; he has treated his theme with genuine appreciation of the place of such concepts in unconscious thought and in consciously accepted products of such thought. His study has, therefore, a dignity and a convincingness which should disarm the prejudiced reader. It throws much light upon the infantile factors at work to maintain the unrealities of phantasy which prevent a straightforward attack upon the realities of human existence. The value of this study, therefore, is one to be measured only by the crying needs of a sick society and of the fettered minds which constitute it.

Jones also attacks the phantasy which binds individuals and society in ignorance and superstition, as he shows the infantile interests which underlie the widespread belief in the significance of salt. He treats of the narcissistic overvaluation of the self which creates a "God complex" in man. He investigates the psychology of war and other political conditions. He examines the underlying motives which find expression in literature or in the lives of the poet, the artist, the ruler. His study of Hamlet deserves high rank in a field where much sterile speculation has taken place. Jones proves that psychoanalysis is capable of throwing light into places long dark

and of giving explanation to what has been most puzzlingly obscure. The book forms a valuable addition to psychoanalytic literature and a worthy contribution to the study of religion, esthetics and world politics.

Baudouin, Charles. *PSYCHOANALYSIS AND AESTHETICS.* [Dodd, Mead and Company, New York.]

The psychological insight of the translators, Eden and Cedar Paul, guides the reader into an appreciation of this work. Their translation of Baudouin's thought with their faithful rendering of Verhaeren's own verse which Baudouin has used follows an excellent introduction to the work which they have thus presented to English readers. They recognize Baudouin as psychologist and poet, himself able to enter into sympathetic understanding of the work of Verhaeren. So much of Verhaeren's own writings are incorporated into Baudouin's study that the poet remains no longer a literary stranger. Deeper than this, Baudouin grants an acquaintance with this creator of poem and drama as Verhaeren learns to know himself through the travail of his poetic creation.

His psychological development is traced from the first spontaneous revelations of his inner anguish, through a long struggle, when he is weighed down to experiences that are base, and then out into the victory which he achieves through the aid of his poetic symbolism. Verhaeren goes further, Baudouin shows, than victory merely for himself. He enters, likewise, more or less consciously, into the new era of art. For, in place of subjective absorption in himself with its spontaneous symbolization of the inner experiences, he comes to employ his art objectively upon the external world. His genius is too sure, his work too sincerely his own to permit this to be a loss of his own personal expression through art.

Baudouin's study is thus an important contribution to the history of esthetics and it is a revelation of the function of psychoanalysis as a means to such an end. He finds in the writings of Verhaeren the deepest complexes that stir in the human psyche. He discovers them at work causing struggle, regression, despair in the life of the man who gives expression to these in his poetry. It is through the expression of these experiences not by escape from them that his victory is won.

Baudouin has partially but not fully made clear the rejection of certain introverted attitudes through the very excess of the inner factors of such introversion. This is most present in Verhaeren's break with the religion in which he had been bred. It accounts for the failure of mysticism as a way into equilibrium, a way which so many other similar natures have found. Baudouin speaks plainly of the *Œdipus* complex at work here but not so plainly of some of the elements which enter into this complex. He realizes the introversion of the earlier period from which Verhaeren was "converted" to the healthy extroversion of his later life and work. Yet Baudouin sets up a barrier for himself against accepting Freud's analysis of the sexuality which exists behind repression, vivid in its infantile ele-

ments. These give to a personality the definite fixation points for its introversion. Some of Baudouin's analyses approach this material which theoretically he will not fully accept. Verhaeren's own lines, which are quoted to prove the latter's attitudes, are redolent of it. How are we to know all the conflict of a man or to understand the power of the product which arises out of it if we do not frankly accept all the details of the buried unconscious? The effect of these cannot be absent even from the highest victorious achievement.

The analysis of Verhaeren's dramas in the chapter called "An Œdipus Trilogy" is particularly instructive. Baudouin speaks a word here for the lyric drama as most intimately arising from the unconscious. The force and clarity of Baudouin's own thinking are revealed in his discussion of symbolism and its function in imaginative activity. He considers the symbol as the "result of condensations, displacements and repressions"—these terms not in the strictly Freudian sense—as the means not alone of unconscious expression but of the evolution of the conflict to be expressed. Baudouin's terminology throughout is not entirely that of the psychoanalysis the principles of which he applies. If he deals somewhat selectively with these principles, nevertheless he has given us the work of an investigator whose intuitive sympathy is guided by a fine intellectual understanding.

L. BRINK, PH.D.

Hadfield, J. A. PSYCHOLOGY AND MORALS. AN ANALYSIS OF CHARACTER. [Robert H. McBride & Company, New York.]

An appraisal of this book is difficult, not only as to matter, manner and meaning. As to matter the author has collected a lot of actual observation; he is fairly sound in that he has left the older highroads of rationalization and come to grips with actual human beings. As to manner! *cela depend*. It is a question of taste whether the mode of exposition should be rambling, hit or miss, and diffuse, as we here deem it, or more systematic and schematic, a delight to the pedant and the would-be scientist. At all events the author's manner has an appeal in that one can read it without the fatigue often accruing from more "scholarly" presentations.

And finally as to meaning! Who would be rash enough to really define the philosophical foundations of a rational ethics in its relation to psychogenic disorders? That the author would even attempt to correlate them is of interest—and yes, even of value. No matter how fragmentary the effort, it is desirable and in the present instance, a commendable effort. We doubt if the author really knows what he means by the "reduction method," but this is not so essential. He has written a sincere book and as such it contains much that is worth while.

Walter, Herbert Eugene. GENETICS. AN INTRODUCTION TO THE STUDY OF HEREDITY. Revised Edition. [The Macmillan Company, New York.]

The form as well as the content of Walter's book is well fitted to extend information upon the important matter of heredity or genetics,

as he prefers to term his subject. He has revised his earlier edition in recognition of the progress made during the intervening years in his subject. This at best is still veiled in more or less obscurity because of its range backward and forward in the movement of life and because it concerns that which is never static. Yet he has noted those points at which theory could be built, even if it must give place to new theory, at which definite understanding of the nature of the genetic possibilities of life may be obtained and at which some element of control may enter. He has followed his subject in this way through its history since men have occupied themselves with it as a science. He has reviewed the conflicting theories and the progress in the knowledge of biological development which together they have attained. He gives illustrations of the laws of heredity and their action in various forms of life. He speaks emphatically of the responsibilities which the importance of heredity puts upon man in controlling the welfare of his own kind. His manner of writing is vivid and popular. One might complain of an over use of catch sentences in this effort to be readable for sometimes they fail to give the scientific point the sharpness which it should have. One may emphasize the factor of heredity too much, relatively. Though he has well illustrated heritage as the base while environment and response form the other two sides of the triangle of life, yet the interaction of the three should have been more fully developed to reveal a wider psychological ground. Here the problems which heredity has brought man as well as the future control of genetics may be attacked with more promise.

Eidmann, H. DIE ENTWICKELUNGSGESCHICHTE DER ZÄHNE DES MENSCHENS. [Hermann Meusser, Berlin. \$2.85.]

In view of the fact that endocrinological research is more and more demanding close observation of developmental variations, this more than interesting as well as scholarly summary of the evolutionary history of the teeth in man is of special interest.

If one would obtain a short, authoritative and yet comprehensive vision of the phyletic and ontogenetic story of the human teeth it can be found here.

Lovell, H. Tassman. DREAMS. Monograph Series II of the Australasian Association of Psychology and Philosophy. [Gordon and Gotch, Sydney.]

A small unbound brochure of simple pretensions which gives an appreciative sketch of Freud's general ideas of the dream and its functions, chiefly derived from his monograph, with a brief critique founded more upon general *à priori* considerations rather than upon clinical study of the phenomena in question.

Salmon, Thomas W. MIND AND MEDICINE. [Columbia University Press, New York.]

It is a matter for gratitude that Professor Salmon's address at the opening session of the College of Physicians and Surgeons, as this entered upon its last year's work, should have been perpetuated

in its present durable form. This is fitted to preserve the grace of style and the serious forcefulness of the message which was delivered, and to disseminate the latter to bear fruit throughout the medical profession. Professor Salmon pleads that medicine will cast off the neglect it has shown toward all forms of mental disease. He points out that the high development of medical research in the field of structural changes has turned interest so far from the problems of mental functioning that these are scarcely recognized as belonging in the medical field. Yet experience, recognized by those willing to turn their attention upon it, proves more and more convincingly that mental and social problems make claims preëminently upon the medical profession. The medical profession, in turn, loses much opportunity for the study of organic disease by neglecting the field of mental disease, which offers rich material for such study. The future doubtless contains promise that far more extensive correlation between organic changes and mental states will be discovered. The author begs, however, that even now, in the meantime, while that promise must remain unfulfilled, the functional side shall be permitted to come to its own.

Bernhardt, E. A. PSYCHISCHE VORGÄNGE BETRACHTET ALS BEWEGUNGEN. [Verlag von Leonhard Simon, Nf. Berlin.]

The behavioristic school, Watsonian and others, of which there have been many forerunners and Watson but an echo, would, in a sense, interpret all psychical phenomena in terms of motion, and not without some justification.

Hering, Mach, and others, founders of the energetic discipline, who have wished to see living phenomena largely as resultant of cosmic energy transmutations, have laid the foundations of a partly mechanistic philosophy from which there have been many attempts to escape.

The present small brochure deals with movement as a resultant of psychical activity, and as such presents an interesting thesis towards its definitive demonstration. As such it is an appraisal of the claims of a purely behavioristic psychology which is answered in the affirmative, and as such to be judged and evaluated. Although there are but a short hundred pages in this interesting monograph, its scholarly method is admirable and its conclusions worthy of careful consideration.

Herein the behaviorist will find much comfort for his attitude concerning man as a mechanism. The present day neuropsychiatrist will find much of interest in this short, concise, and clear-cut portrayal of a mechanistic interpretation of psychical activities.

OBITUARY

HENRY HUN

1854-1924

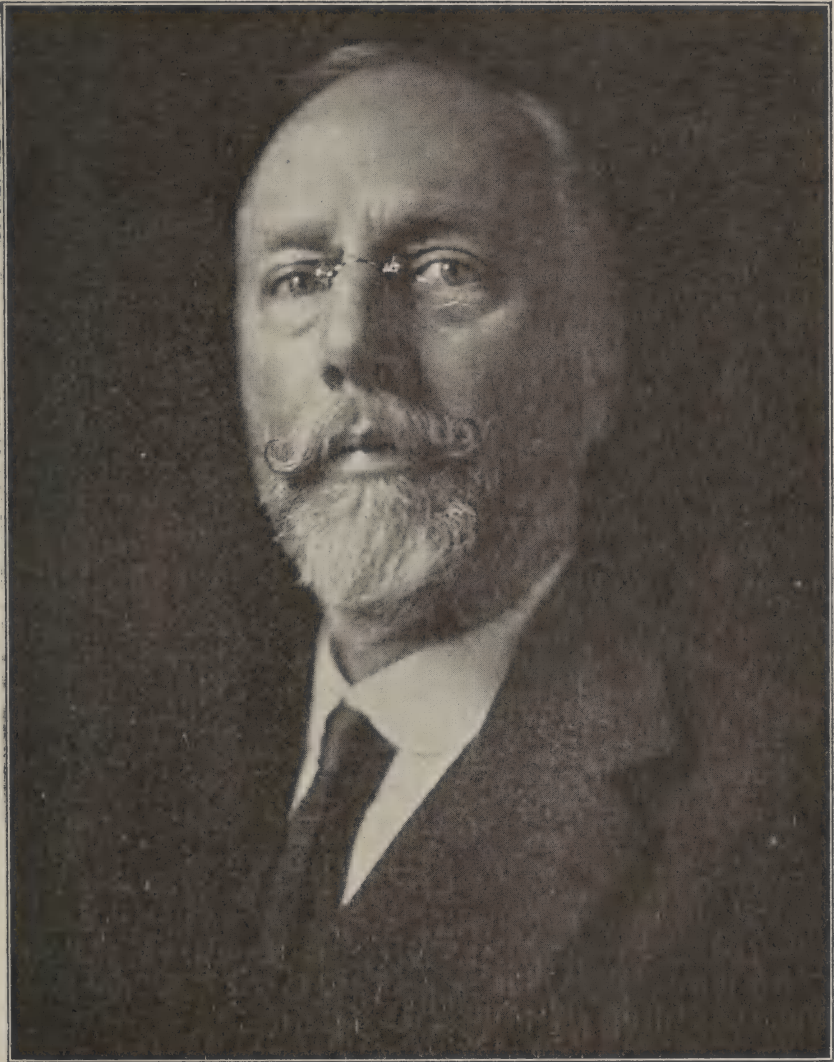
In the fullness of a rich and completed life, Dr. Henry Hun, one of the most distinguished neurologists of this country, died at his home in Albany, N. Y., March 14, 1924, from lobar pneumonia. Seventy years of life was almost completed, a half century of which, glowing to the last, was devoted to the humanities and to his professional work. Dr. Hun was endowed by nature with a wealth of talent, a magnetic and commanding personality, which, gifted with unusual keenness of observation, exceptionally well fitted him for the prominent place which he held as a consultant, a teacher and an author.

Dr. Hun was born in Albany, March 21, 1854, the son of Dr. Thomas Hun, an eminent Albany physician, one of the oldest and most prominent families in Albany which traces its origin to Harmen Hun of Holland, whose grandson, Harmen Thomas, came to Albany and married in 1661.

Dr. Hun was graduated in 1870 from the Albany Academy. He then attended the Sheffield Scientific School, obtaining his Ph.B. in 1874 and his M.D. in 1879 from Harvard Medical School. Two and a half years were then spent in studying in various European capitals. While in Paris he became a pupil of Charcot and devoted most of his time to that great master's clinic and laboratory at the Salpêtrière.

On his return to Albany he became teacher in the Albany Medical College and was made attending physician and neurologist to a number of the hospitals. He plunged at once into improving the standards of medical education, engaged in clinical and pathologic research and spent much time studying and treating the chronic invalids in the humbler districts of Albany which won for him the enduring admiration and gratitude of the poorer classes. He commanded as well an extensive and lucrative practice among the wealthier, but he always continued to exhibit toward the sick poor the same spirit of generosity and interest. Very early in his career, Dr. Hun gained recognition and prestige by reason of his superior knowledge of

medicine in general and of neurology in particular and became a favorite and eagerly sought consultant throughout the central and eastern part of New York State.



HENRY HUN
1854-1924

As a teacher of medicine, Dr. Hun justly enjoyed an enviable reputation. From 1885 to 1914 he occupied the chair of neurology in the Albany Medical College, where he organized a department of

neurology, the efficiency and general excellence of which gained nation-wide recognition and attracted to the school many students from even remote parts of the country. He was an admirable and fascinating teacher. He embodied the attributes of the master. He was distinguished in appearance, had an excellent diction as well as a forceful method of presentation. He was lucid and logical and inspired respect and confidence. An undercurrent of ironic humor constantly trickled through his being and rendered him both interesting to his friends and formidable to his students who were called upon to present cases before his clinic.

Dr. Hun has written his name in the history of American medicine with no uncertain hand. His unique volume entitled "An Atlas of the Differential Diagnosis of the Diseases of the Nervous System" is a work of unusual originality. His "Syllabus of a Course of Lectures on the Diseases of the Nervous System," a practical notebook in two volumes for students, has been regularly used by them in the Albany Medical College since its appearance in 1901. A series of over thirty papers upon different topics of medical or neurologic interest, all of the highest order and some of them of the utmost scientific value, have been written by him.¹ Among them his important contribution to the subject of the cortical centers of vision through his report of a case with necropsy in which a lower quadrantal field defect carefully studied and charted during life was found to correspond to a lesion sharply limited to the lower half of the cuneus is of outstanding merit.² With Van Gieson he was one of the first to adequately define the syndrome of the posterior inferior cerebellar artery³ and to furnish a detailed topographic description of its anatomopathologic substratum. Dr. Hun's contributions to myxedema and myasthenia gravis were among the earliest in this country.

Dr. Hun was president of the Association of American Physicians (1910) and president of the American Neurological Association (1914). He was also a member of the Medical Society of the County of Albany and of the State of New York, of the American Medical Association and the American Psychiatric Association.

Dr. Hun was genial and affable in his private life, solicitous for

¹ A complete list of Dr. Hun's contributions appears in a history of the American Neurological Association published on the occasion of the Association's Fiftieth Anniversary, June, 1924.

² A Clinical Study of Cerebral Localization. The American Journal of the Medical Sciences, January, 1887.

³ Analgesia, Thermic Anesthesia and Ataxia. New York Medical Journal, April 17, May 1 and 8, 1897.

the welfare of his family, and the atmosphere of his home was one of sunshine and cordiality. He was a man of artistic temperament, broad culture, and refined tastes. He was extremely fond of good drama and music, unusually well versed in literature and exhibited almost idolatry for the art of the great masters.

Dr. Hun married Miss Lydia Marcia Hand, April, 1892. He is survived by his wife, two sons, Dr. Henry Hun, Jr., and Samuel Hand Hun and one daughter, Miss Lydia M. Hun.

WALTER E. FERNALD, M.D.

Dr. Walter E. Fernald died at Waverley on November 26, 1924, thus ending a life of rare distinction and noble endeavor.

He was born in Maine in 1859, received his preliminary education at New Hampton (N. H.), and graduated from the Medical School of Maine (Bowdoin) in 1881. From 1882 to 1887 he served in the Mendota State Hospital, Wisconsin, and in 1887 was appointed Superintendent of the Massachusetts School for the Feeble-Minded. He supervised with the greatest skill the construction of a new institution at Waverley and by 1893 completed the transfer of his 400 charges from Boston to their new school.

At Waverley Dr. Fernald gradually built up an organization for the training of the feeble-minded, which has become a model and which has attracted visitors from all over the world.

It is difficult to do justice to the varied aspects of his activity. He supervised with conscientious care the study and training of his handicapped wards, outlining to the last detail their daily program. He grouped around him able teachers and inspired them with his devotion. He instructed physicians, medical students, psychologists, social workers, nurses. He lectured at Tufts Medical School, and at Harvard University, from which in 1918 he received the honorary degree of M.A., he gave courses both in the Graduate School of Education and in the Graduate Courses in Medicine. He contributed to medical literature the results of his special researches and of his maturing thought. He inspired wise legislation in the interests of the mentally handicapped. He realized that, without the coöperation of an enlightened public, scientific accomplishments may remain sterile, and he gave much time and energy to the promotion of this coöperation.

During his lifetime notable contributions were made from various directions to the study of the mentally defective and to them all he showed a receptive and enquiring attitude. The introduction of the



WALTER FLMORE FERNALD¹
1859-1924

Binet-Simon tests gave a method of precision which he utilized with wise discrimination, for his own observation and keen intuition had given him a body of experience which enabled him to place new data

¹ Courtesy of *Boston Medical and Surgical Journal*.

in their true perspective. His main interest was in broad clinical observation, but the anatomical basis of the phenomena he observed was a subject of earnest investigation, which he carried on along with Dr. E. E. Southard and other collaborators. The Waverley Researches on the Pathology of the Feeble-Minded (1st Series, May, 1918; 2d Series, Dec. 1921; 3d Series, in preparation) represent the high-water mark of research on the pathological anatomy of feeble-mindedness in this country. His receptive mind made him eagerly scan the promises held out by the new discipline of endocrinology, and willingly advocate a thorough trial of the new methods.

He himself has reviewed the development of thought in relation to the topic of feeble-mindedness in his Presidential Address to the American Association for the Study of the Feeble-Minded, May, 1924, in which he looks back to the situation in June, 1893, when he held the same honorable office and delivered his first Presidential Address to the Association. The first two decades of that period had been fertile in investigation, and had ended in pessimism; "intelligence" tests had focused attention in a precise way on an irremediable defect, studies of the heredity of "hovel" defectives had demonstrated the source from which they sprang and the atmosphere in which they lived, analysis of gaols and penitentiaries seemed to show the end of their careers. The feeble-minded were considered as individuals not only of fixed intellectual level, but of criminal tendencies and with a deep-seated hereditary taint, they were useless and a danger, to be segregated and sterilized. This conception, so intolerable to his warm human sympathies, Dr. Fernald called the "Legend of the Feeble-Minded"; he showed that it was based on the study of the troublesome group of defectives, the only group studied during these earlier years, and he never wearied of calling attention to the still larger group of the mentally handicapped, often of amiable disposition, found sporadically in homes of every type, receptive of a training suited to their needs, able under kindly supervision to take a useful part in the economic life of the community. He placed the dark side of the picture in correct perspective, redressed the faulty balance, emphasized the assets as well as the liabilities of the mentally handicapped, and instead of dwelling entirely on the protection of the community from the liabilities due to this group he called attention to the equally important need of justice being done to these handicapped ones. In order that they may be an asset and not a liability, early diagnosis, appropriate training, kindly social supervision are imperative and the organization of the requisite provisions for these three activities devolves on the state and on the community at

large. These views of Dr. Fernald came to full fruition when in 1919 the Massachusetts Legislature passed a law for the state-wide examination of mentally retarded children. When this law was passed Dr. Fernald devoted himself to its successful application; he did everything possible so that the contemplated survey should proceed with the maximum smoothness and efficiency; he gave a series of courses to the physicians, on whom the actual examinations devolved, and it was in the middle of such a course that he was stricken with his fatal illness. No one factor contributed so much to give the public confidence in the wisdom of the measure as the fact that it was personally sponsored by Dr. Fernald.

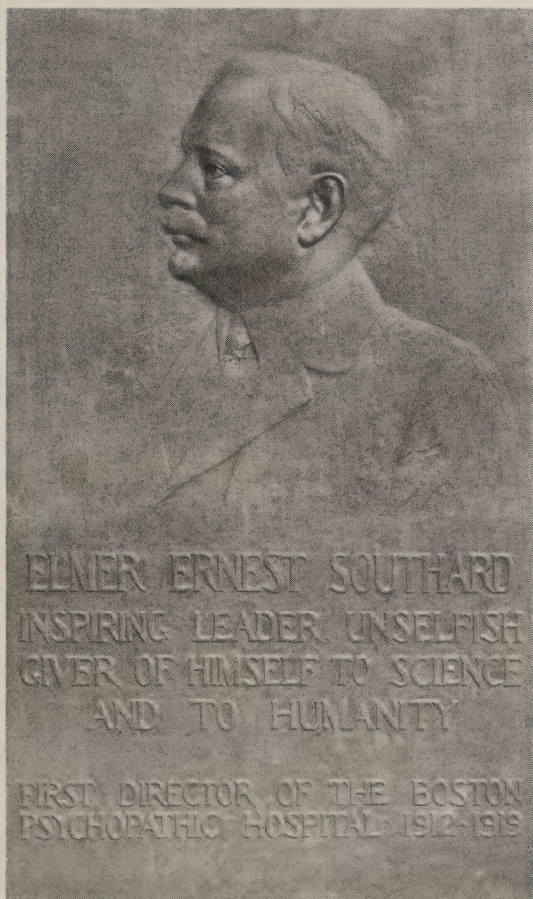
The importance which he attributed to the education of the community in regard to problems of mental health in general was shown by his active participation in state and national organizations. He was Vice-President of the Massachusetts Society for Mental Hygiene, of which, since its incorporation in 1912, he had been the constant inspiration. As Director of the National Committee for Mental Hygiene and Chairman of its Committee on Mental Deficiency, he helped to promote those systematic surveys of the needs of the mentally handicapped which led in many states to extensive constructive measures. He was President of the Boston School for Occupational Therapy in virtue of his consistent advocacy of the gospel of work for the mentally and physically handicapped. When the Massachusetts Psychiatric Association was formed in 1924 he was naturally elected its President, and shortly before his death he presided at its first scientific session.

In Dr. Fernald there passed away a great citizen, a public servant of the highest standards, a very perfect gentleman. *Si monumentum requiris circumspice.* To find his monument one will not look round any imposing structure, one will not altogether find it in the buildings at Waverley which were his creation; one will find it dispersed through the breadth of the Commonwealth in the simple contented lives of countless men and women, who, but for his training and kindly supervision, would have had a bitter experience of human life.
—*Boston Medical and Surgical Journal.*

NOTES AND NEWS

DR. ELMER ERNEST SOUTHARD

On November 18 the memorial to Dr. Southard was unveiled at the Psychopathic Hospital. It is a large bronze portrait bas-relief, a notable portrait as well as a work of art, done by the sculptress, Baschka Paeff. It is in the main entrance hall.



—By courtesy of *Boston Medical and Surgical Journal*

The unveiling was attended by a considerable group of Dr. Southard's friends, coworkers, and students. The exercises were simple but impressive. The unveiling was by Dr. Southard's daughter, Anne.

Dr. William Healy spoke shortly of Southard the versatile contributor to Science and the planner, of the Psychopathic Hospital. Dr. Harvey Cushing spoke of Southard the man who refuses to let himself be forgotten, and Dr. Macfie Campbell talked of Southard as an indefatigable worker who passed on the torch of knowledge.

All those interested were invited to call and see the memorial.—
Boston Medical and Surgical Journal.

DR. GANSER: A BELATED CORRECTION

In the April issue of the JOURNAL of 1923, by mistake, a birthday notice of Professor Ganser of Dresden was published as an Obituary. We have been negligent in correcting this mistake.

We are publishing Dr. Ganser's delightful reminder of our dereliction:

DRESDEN—A 12. XII. 23.
LÜTTICHAUSTR, 25.

TO DR. S. E. JELLIFFE,
64 West 56th St., New York.

Editor of the JOURNAL OF NERVOUS AND MENTAL DISEASE.

Dear Sir: Only few mortals have the joy of reading in their lifetime what their fellow-mortals intend saying about them at their graves. From the information which has been kindly sent me I belong to these favored ones, as you in H 4 of the JOURNAL OF NERVOUS AND MENTAL DISEASE do me the honor of dedicating an obituary notice to me. I have the pleasure of presenting myself to you as being very much alive and at the same time gladly tell you that here in this country there is a common saying that those who by mistake have been erroneously announced as dead, generally live the longest.

I have not myself seen your Necrologe; as I am told, however, that it is very flattering for me, I have naturally a lively wish to read it, and therefore take the liberty of asking you if you will make the measure of your kindness full and send me a copy of your valuable JOURNAL, as I cannot get it here?

Thanking you heartily both for your obituary notice and for sending me your paper, I remain, Yours very truly,

DR. GANSER

N. B.—All business communications should be made to Journal of Nervous and Mental Disease, 64 West 56th St., New York.

All editorial communications should be made to Dr. Smith Ely Jelliffe, Managing Editor, 64 West 56th St., New York.

The Journal OF Nervous and Mental Disease

An American Journal of Neuropsychiatry, Founded in 1874

ORIGINAL ARTICLES

REMARKS ON THE PATHOLOGICAL ALTERATIONS OF THE CORTEX CAUSED BY PSYCHOSES

BY PROFESSOR DR. OTTO MARBURG

OF VIENNA

The preliminary conclusion of the researches into the pathological alterations of the cortex in the course of certain psychoses which, for some years past, have been carried on by my colleagues, S. Saito, Takase, Naito, and Oseki, in collaboration with myself, permit me to add a few supplementary remarks on the subject. The latter could not be made before a survey over the various psychoses had been obtained and parallels drawn between the single observations.¹

The first problem admitting of a solution, up to a certain extent, refers to the *significance of the meninges for the alteration of the cortex*. I believe it is generally overrated. There can be no doubt but that the meningeal process, especially if conducive to cohesions with the brain underneath, will injure the outer layer of the cortex. Given certain conditions, this may result in degenerative alterations of the tangential layer of fibers, consequent upon which the ganglion cells will occasionally exhibit serious degenerative alterations not actually referable to the primary process, but to be regarded as an effect of meningitis. Strictly speaking, the latter statement holds good for parietal alterations of the meninges only, and for part of the senile ones. Of how little consequence the meningeal affection is for the parenchyma under it is very striking in the majority

¹ Items for comparison gathered from the different cases published in the *Arbeiten aus d. neurologische Institut*, Vol. 25, 26, 1923, 1924.

of cases. As a matter of course, we must except those in which the inflammatory process has invaded the brain. What strikes us further is that, whatever the process in the meninges, it is a discontinuous one which in itself would tend to prove that no determinative significance can be ascribed to it with reference to the alterations of the cortex. This is true—to some extent at least—even of paresis.

Another question urging itself upon us is as to whether the various psychoses find their correlation in entirely definite alterations of the ganglion cells. As may be inferred from the lists of literature attached to each single paper, the most eminent investigators have pronounced against the specificity of the alterations of ganglion cells in the different forms of psychoses. This seems to me to be going too far. A minute consideration of the complicating alterations due to the fatal disease justifies our regarding quite a number of cell alterations as specifically undetermined psychoses. Thus Takase has found in cases of manic-depressive psychoses what is termed a chronic change or sclerosis, and what I consider a coagulation necrosis. Identical alterations, only a little more marked, and joined to an augmentation of lipofuscin, are to be found in senium. Osekí's preparations, however, strike me as proving a certain divergence between these two alterations even beyond the difference of intensity.

If we may judge from analogies, this alteration would correspond to a disorder of the vasculotrophic sooner than to any other cause. It is a well-known fact that the same alteration is to be met with in part of the cases of schizophrenia, although much more rarely so in the cases described by Naito than in those, for instance, on which Josephy dwells. On the other hand, they exhibit a lesion which may be termed an infiltration with fat. The process consists of a swelling of the dendrites, their fading and breaking, and the appearance of a delicate network within the cell which, if dyed scarlet, proves to be filled with little drops of fat. This honeycombed, vacuolar, fatty degeneration is practically the most striking alteration of the ganglion cells in the cases of schizophrenia examined by Naito. As regards paralysis, it is here that Nissl's grave degeneration is most frequent and most clearly defined. I am prepared for the objection that cells infiltrated with fat, together with such of a sclerotic type, are to be found in paresis also. So far I have always refused to adopt the hypothesis that possibly two processes develop side by side with paresis, as pointed out by Spielmeyer, *i.e.*, one of an inflammatory, the other of a parenchymatous, degenerative character. I held that the latter might be explained as the outcome of an inflammation or

as a stage of the latter, let us say in E. Pollak's acceptance before the setting in of exudation. It is just the comparative research into the cortex of psychoses that now compels me to fully share Spielmeier's view and to recognize a degenerative process along with the paralytic one. It would seem as if the lesion of the parenchyma were also manifest in the clinical aspect. There is one form of paralysis known to us very closely resembling the circular psychoses, and yet another accompanied by hallucinations which in many respects apes the aspect of schizophrenia. It is not at all unlikely that these clinical differences manifest themselves anatomically in a lesion of the parenchyma in the manner of the above mentioned psychoses, it remaining doubtful at the same time whether we have to deal with complications here, or whether the same noxious agent causes both alterations through the lesion of an intermediate link.

An examination of the nerve fibers also permits a differentiation of the aspect of the cortex consequent upon psychoses. The slightest intensity of alterations is displayed with manic-depressive psychosis. In this case the superradial network only is affected, whereas the lesions caused by schizophrenia are more serious, as they also concern the interradian network, and occasionally even the radii. Paresis is amply characterized by a discontinuous myelinal decay and a patchy destruction of the myelin, and senile psychoses by the process neither sparing any part of the cortex fibers nor totally destroying it, but only causing a widespread atrophy. Thus also an examination of the fibers will enable us to differentiate the cortical process for the purposes of diagnosis.

Now, it is not devoid of interest to see in what different ways the glia adapts itself to the different forms of psychosis. On the one hand we notice a distinct proliferation, a tendency to make up for the destruction, and even going beyond the latter; on the other hand we see the glia failing entirely in this respect with functional psychoses, among which schizophrenia is attended by a lesion of the glia apparently quite analogous to that (the lesion) of the ganglion cells, although the tendency for proliferation is more marked in some spots, and particularly so in the mark leiste.

Paresis occupies a position midway between the senile psychoses and the functional ones. In some sections the glia succeeds in completely exercising its recuperative function; in others it fails to do so. The mesodermal elements, too, exhibit distinct differences. It may suffice to point out the arteriosclerotic alterations in senium, the luetic ones of the vessels with paralysis, and the quite peculiar pre-

sclerotic ones—if we may term them so—with manic-depressive psychosis, whereas the vessels prove perfectly uninjured with schizophrenia.

From the few facts [observations] here mentioned it follows that we are fully able to differentiate the four groups of psychoses we have dealt with in a pathologic-anatomic sense. It remains to be seen whether the observations gained so far enable us to contribute towards the better knowledge of the pathogenesis of this process. I may be permitted to leave aside paresis and senility. In contemplating the vascular alterations with manic-depressive psychosis, we are, in many respects, reminded of what I have said regarding vascular trauma. This analogy with trauma would justify the application of Ricker's view to certain psychoses. As we know Ricker regards the alteration of the vessels due to trauma as a lesion of the vasomotors, *i.e.*, a paralyzation of the vasoconstrictors resulting in a slowing up of the circulation, a pre-static condition preceding stasis. We may readily assume the same vasomotor disturbance to prevail with the focal alterations, found with circular psychosis, when spasms and paresis may appear alternately. I imagine that the brain must show conditions analogous to those of all the other organs; that we might find something similar to vasomotor contracted kidney in the brain as well, the symptoms only being different, corresponding to the different organ. To admit the existence of such a process with schizophrenia is, however, much more difficult. The impression of a grave toxic injury is prevailing here. I am prepared for the objection that such a lesion of the vasomotors would have to make itself felt in other parts of the body as well, but we must reject this objection as unjustified on the ground that the centers of the vasomotors of the brain are surely independent of those of the body, and located by themselves, evidently before the latter, that is, orally from the medulla oblongata, as Hauptmann says. Jacobi even ventures to assume special vasomotor centers—one each for the fourth and the third ventricles under the influence of certain glands. However, these are but hypotheses, like all the rest of the theories referring to the vasomotors. I only deem it incumbent upon me to direct attention to, and furnish some foundation for it as we constantly hear it discussed without anyone being able to form a clear notion of it.

Another problem admitting of a solution in part regards localization in a level-cut. There is no denying that the third layer of ganglion cells—*i.e.*, the layer of medium-sized pyramids—is the most

vulnerable of the cortex. It is injured in all cases of psychoses, and yet it were a mistake to interpret its lesion in the sense of Vogt's pathocllisis. Though in some single cases the affection may be restricted to this layer alone, it is nevertheless possible to trace the spreading of the process over one of the adjoining layers in the next following preparation. We can only ascertain the affection of the third layer to be predominant just as, given certain conditions, the second layer is preëminently affected, especially with paresis, whereas the process with schizophrenia hits the deeper layers along with the third. In maintaining that it is the outer strata of the sixth layer which, with schizophrenia, are attacked more than the fifth layer, I differ from Josephy and Vogt but in topical distinctions. These two investigators evidently consider the outer strata as forming part of the fifth layer, the separation [demarcation] of the layers not always being easy in the various areas of the cortex. The most essential thing is that, as a rule, the process is not continuous; areas lying close together may prove to be affected in entirely different manners. This applies to all psychoses. It is further the rule with all psychoses for the process to ebb away as it develops from the oral to the caudal region, without the occipital lobe being always exempt from the affection; although it is decidedly the least injured through all kinds of psychoses.

A more minute localization on the surface has been fruitful of highly remarkable results to which, in my opinion, may be ascribed the greatest importance for symptomatology. Takase was able to demonstrate that circular psychoses by preference attack the region of the frontal lobe anterior to the central gyri, and the region of the temporal lobe corresponding to Flechsig's anterior association center, that is, the second and third temporal gyri. Now, what is the meaning of these so-called association centers? We are aware that none such exist at all. The projection fibers originating there are the fronto- or tempo-thalamic ones, transmitting their impulses from this point to the striatum, and being thus closely connected with tone centers. The second system is the fronto-ponto-cerebellar, or the temporo-ponto-cerebellar one or Türck's bundle, respectively, which I declared to serve for the regulation of dynamic function. While the kinetic system originates in the anterior central gyri, another system related to tonus and statics springs from the frontal and temporal so-called association-regions, and from a system serving dynamics. In their turn the above areas receive their stimuli orally of the sphere of bodily sensations, and temporally of the sense

centers. Ramon-y-Cajal's investigations have proved the super- and interradianal networks to contain exogene fibers only, the latter comprising those fibers also that originate in other parts of the cortex. Manic-depressive dementia affects the superradianal fibers. It is therefore a disturbance of the transmission of stimuli from the above named spheres to the dynamo-tonic centers which ordinarily are stimulated together with any other sensation of the senses. I trust we may safely regard this mechanism as the equivalent for the tone of sensation accompanying every perception, so that the above mentioned areas would form the centers for affectivity. Anglade has arrived at the same conclusions by another road. He, too, considers the so-called association-regions centers of affectivity, with this distinction, that, on account of euphoria accompanying aphasia with logorrhea, he denotes the temporal lobe as the center for manias, and the frontal lobe as the center for melancholic processes. I believe that we must needs reject this way of explanation, mania and melancholy not being localized but representing inhibition or release [relaxation] within the region of the affectivity centers; the latter process allowing a variety of interpretations, as, for instance, interference phenomena, disorder of the organs of sense, or metabolic alterations of the cells.

The fact that each individual case of schizophrenia spreads over another region may explain the variety of its clinical aspects. It is, however, most imperative to investigate clearly defined cases of all the different types, in order to see whether the mode of parenchymatous lesion might not also account for the clinical variations. What I mean is whether those alterations may not sooner be met with among the different forms of schizophrenia we have described as appertaining to manic-depressive dementia.

Concerning symptomatology, I should like to direct attention to one more point. Usually the idea of dementia is brought into relation with a lesion of the fore-brain. In my opinion this cannot hold good. In examining cases of grave dementia we find the process invading the whole brain and the cellular destruction not limiting itself to isolated layers, but spreading more diffusely, as very clearly visible in Oseki's cases of senile dementia. This alteration accompanying dementia of the brain is yet more marked in the fibers than in the cells, as in this case not the delicate network only but Baillarger's stripes may have suffered along with the fibers. Thanks to Jendrasik's statements, we know how essential the stripes are for the maintenance of what we call "memory." Hence it follows that we shall

have to abandon the notion of dementia and atrophy of the fore-brain being identical and require a serious, rather diffuse, alteration of the cells extending over the whole hemisphere to form an anatomical substrate of dementia, an alteration accompanied by a destruction of fibers, in particular those intersecting the cortex in the shape of network and stripes.

I have deemed it incumbent upon me once more to dwell on these points which struck me in the course of my investigations into the different psychoses as they seem to indicate the path along which neurology may be introduced into psychiatry, a postulate acknowledged by Griesinger and Westphal, and lately by Pick.

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CARDIAC NEUROSIS IN THE LIGHT OF MODERN CARDIOLOGY

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The more a physician is in contact with cardiology the more deeply he becomes convinced of the essential truth of the myogenic theory of the heart beat. For that reason it is perhaps a good thing for such a person to concentrate his attention upon the neurological relations of the heart, which he has a tendency to neglect. Indeed, one who was five years in close relationship with neurological work cannot be unmindful of a neurological element in every medical problem. It is easy to forgive the neurologist who finds a neurological cause for most irregularities.

Dividing irregularities into ten groups we find that about half of them appear to be essentially muscular and another half in which there is always a strong suspicion of an extra cardiac neurological influence.

First, let us consider the sinus, respiratory or youthful type.

Perhaps influenced by my early neurological training, as I have studied persons with this type of irregularity in adult life, I am quite impressed with the fact that sinus arrhythmia is a frequent symptom in that general type of disease which, in my neurological days, we called neurasthenia, but which now has been given many other names. The persistence of sinus arrhythmia into adult life or its recurrence at that time is a strong evidence of functional nervous disease.

On the other hand, extrasystoles and premature contractions do not have a neurological source, but are always of myogenic origin.

Third, simple paroxysmal tachycardia bears all the earmarks of being a matter of reflex origin.

Fourth, auricular flutter is an intrinsic disorder of the auricle.

Fifth, nodal rhythm seems to be of cardiac origin.

Sixth, auricular fibrillation is undoubtedly cardiac and it seems to have its origin in a profound disturbance of the chemistry of the heart.

Seventh, heart block is entirely a muscular matter due to damage

or the temporary absence of function in a portion of the heart muscle.

Eighth, ventricular beats sometimes seen when the heart is very slow on account of vagus influence or partial heart block.

Ninth, sino-auricular block is purely a cardiac matter.

Tenth, the pulsus alternans has to do with exhaustion and the

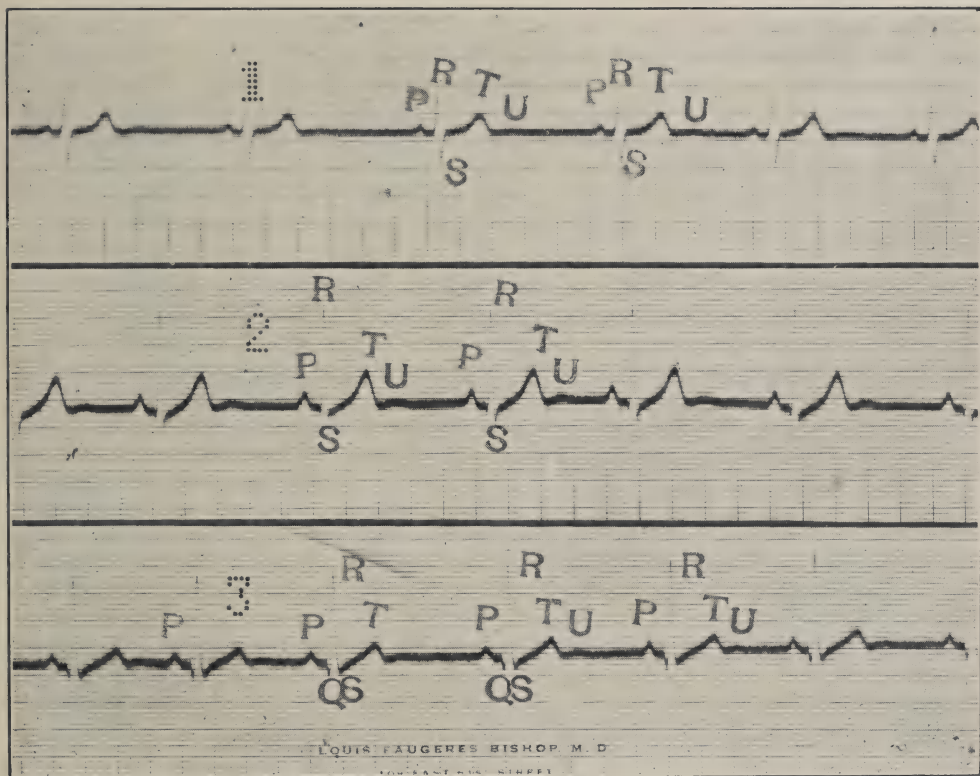


FIG. 1. Sinus Arrhythmia

contractility of the heart muscle; it has no neurological relationship so far as we know.

First, sinus arrhythmia which is also described as vagal arrhythmia, respiratory arrhythmia or the youthful type of irregularity, is due to variations of vagal tone and the consequent waxing and waning of stimulus production or of excitability. This type of irregularity is sometimes supposed to be significant of gross cardiac disease, but in fact is an arrhythmia that usually occurs in people with perfectly healthy heart muscles. (Illustration I.)

By making a person breathe slowly and deeply the relationship between the irregularity and respiration can be seen. The pulse rate slows during respiration. If the heart should speed up on account of exertion or fever or atropine, the irregularity disappears. A person with sinus irregularity is not conscious of any trouble at all. It has, as I said above, a very definite neurological significance.

Extrasystoles or premature contractions are due to some part of the heart muscle becoming more excitable than the sino-auricular node, the normal pace-maker of the heart. Extrasystoles happen when the excitability of the heart muscle is such that it contracts under very slight stimuli that usually would not cause a contraction. We consider auricular or ventricular extrasystoles according as they have their origin in the auricle or the ventricle. (Illustration II.)

Extrasystoles or premature contractions may thus be divided into ten varieties. First, the ventricular contraction may occur before the normal auricular contraction; this is the type we see most often. Second, ventricular contractions may occur at the same time as a normal or auricular contraction; this is also quite frequent, but is an accidental variation of the first. Third, ventricular contraction may follow the auricular at too short a distance for the contraction to be the result of an auricular stimulus; this also is an accidental variety of the first. In other words, these three varieties represent simply an accidental time relation of a ventricle contracting independently. The fourth variety is different in that it interpolates between two normal ventricular contractions, while the first three varieties always interfere with the normal beat. Fifth, multiple extrasystoles in which extrasystoles follow each other in rapid succession and replace the normal beats. So far we have only spoken of ventricular extrasystoles. Sixth, auricular extrasystoles or premature auricular contractions followed by a normal ventricular contraction—the whole cycle being normal, but premature. Seventh, there may be multiple auricular extrasystoles. Eighth, interpolated auricular extrasystoles followed by a normal ventricular contraction, but not interfering with the position of the next natural beat. Ninth, there may be auricular extrasystoles not followed by a ventricular contraction. Tenth, the auricle and ventricle may contract together before the normal auricular contraction is due. This latter variety is a little different from the others because it constitutes a heart beat known as nodal rhythm and has its origin in the auriculo-ventricular node.

Escaped ventricular beats happen when the auricle fails to transmit

an impulse to the ventricle and the ventricle brings into play its own powers of producing a beat. The name escaped beat means that this beat would not have occurred except for lack of a beat that has its origin in the auricle. An escaped beat has its origin in the auricular ventricular bundle or the auriculo-ventricular node. So the ventricle complex is normal and not inverted as it so often is in extrasystoles of the usual clinical type.

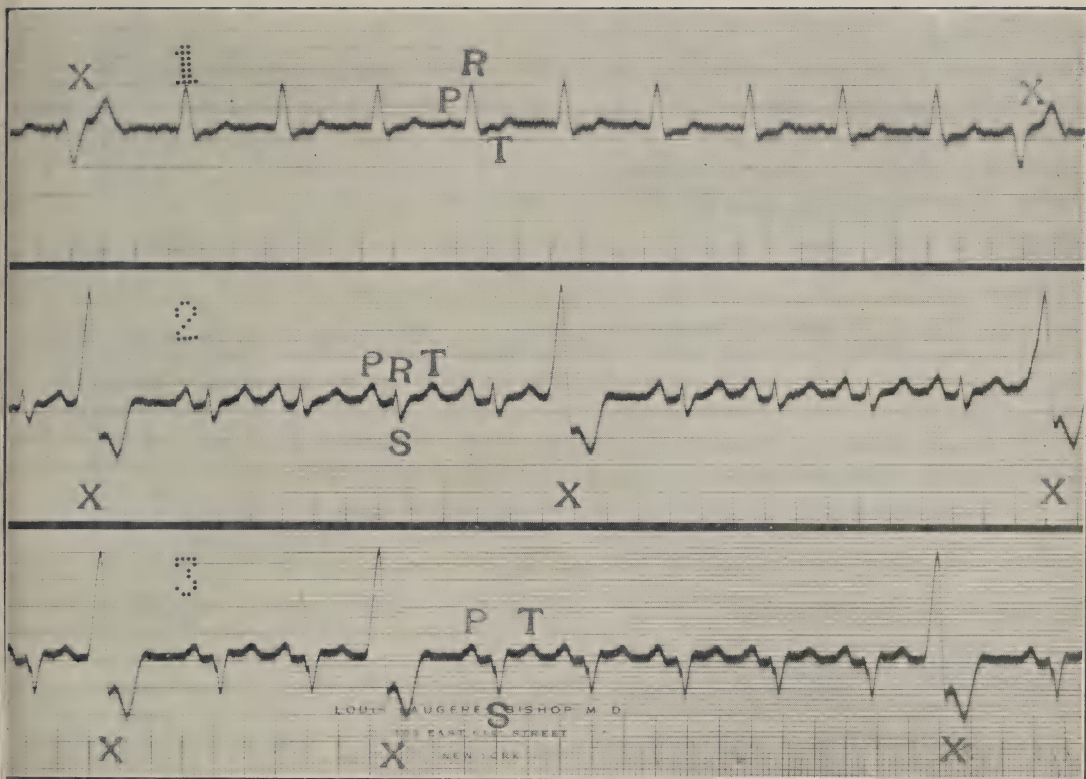


FIG. 2. Ventricular Premature Beat

Simple paroxysmal tachycardia consists of a very rapid heart action commencing suddenly and usually terminating suddenly. It has its origin in a focus of irritation of the auricle which takes the place of the sino-auricular node and gives rise to numerous premature contractions. The fact that the site of the origin of these beats is different from the site of the origin of the normal beats is shown by the shape of the wave as recorded by the electrocardiogram. It is therefore, a series of auricular extrasystoles. Usually after an

attack is over there will be, for a time, a few of these extrasystoles occurring individually. (Illustration III.)

In auricular flutter, which is very closely allied to paroxysmal tachycardia, the auricular rate is greater, the ventricular rate is usually less; this is supposed to be due to a certain degree of heart block which allows a passage for only each alternate impulse. Occasionally there is a response to every third or fourth auricular contraction. Sometimes even the pulse is irregular and may be mistaken for auricular fibrillation. But this is so unusual that it need not be remembered. If this irregularity occurs there should be a greater number of similar interspaces than in fibrillation. A diagnosis, however, between auricular flutter and auricular fibrillation is very important, as fibrillation is much more serious. (Illustration IV.)

Nodal rhythm is a condition in which the stimulus that gives rise to the contraction of the heart arises in the auriculo-ventricular node. The result is that the auricle and ventricle contract about the same time. (Illustration V.)

In the electrocardiogram the P wave often follows the R wave and is so close to it at times that the P wave cannot be distinguished from the R wave.

Auricular Fibrillation—There are two great symptoms that bring people to the heart specialist: The first is cardiac pain, the second auricular fibrillation. The discovery of auricular fibrillation constitutes one of the very high points in modern cardiology. A history of this discovery would be out of place here, but it is one of extreme interest. The radial pulse is completely irregular and there is no evidence of any complete contraction of the auricle when this is sought for by technical means. The auricle is the site of many irregular impulses which do not cause a contraction of the auricle as a whole. The ventricle is irritated by the numerous impulses and so contracts in a rapid, irregular and disorderly manner. The electrocardiogram shows irregular currents of electricity from the auricle, but no evidence of any real contraction. If they are estimated there are found to be five hundred or more and they are never uniform as is shown by the P waves in auricular flutter. They have no relationship to the R wave. The ventricle receives its impulse, of course, from the auricle, so the ventricle complex consisting of the R and T waves are normal. It is not at all uncommon for people with auricular fibrillation to also have ventricular extrasystoles, which gives us an opportunity to compare the normal and abnormal ventricular complex. This condition affects

more than one-half of the heart sufferers when they are decompensated to the point where dropsy appears. The irregularity of the pulse becomes more marked when the pulse rate is greater and is less noticeable when slow. Most other forms of irregularity are less noticeable when the heart is rapid. However, there are occasional examples of auricular fibrillation with very rapid hearts that seem perfectly regular to all possible examinations, except those with

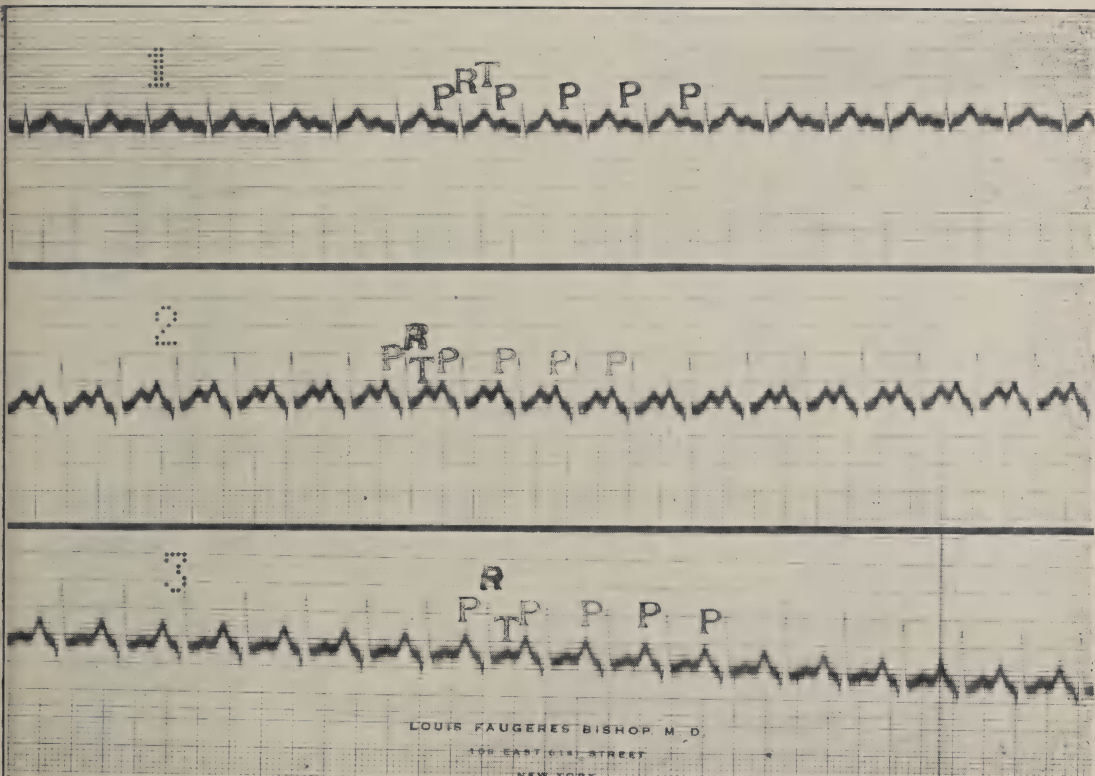


FIG. 3. Simple Paroxysmal Tachycardia

instruments. In those, when the heart beat is committed to paper with the electrocardiogram, it is found that the auricle is not contracting at all and that there is a slight variation in size in each of the beats. A man of very great experience can diagnose fibrillation in a fair number of cases without instrumental help, but a man of moderate experience cannot do it, and I venture to assert that a proper understanding of an example of this type of irregularity is virtually dependent upon the electrocardiograph. (Illustration VI.)

Heart block is a condition of the heart in which part of the muscle has lost the function of conductivity. The symptoms and electrocardiographic evidence depends upon the location of the block. We erroneously speak of lesions in the muscle located between the auricle and ventricle as complete heart block, and that has become a convention. What we mean is that there is complete dissociation in the action of the auricle and the ventricle. Heart block may occur in any part of the heart muscle, and to any degree. Heart block involving the whole heart would be immediately fatal. If the conductivity of the connecting bundle between the auricle and ventricle is only depressed we have a lengthening of the period between the P and R waves in the electrocardiogram. (Illustration VII.)

Of much more frequent occurrence in actual practice is the blocking of the muscle in various parts of the ventricles—the so-called intraventricular block. It sometimes happens when the sufferer has an attack of angina pectoris that we find one of the ventricles contracts before the other, which means that only one ventricle is receiving its impulses. This is shown very nicely in the electrocardiogram where we get the same shape of T wave as we do in ventricular extrasystoles where also the contraction of the auricles are not synchronous. (Illustration VIII.)

It is very important to bear in mind that the depression of conductivity can occur in any part of the heart muscle, though there are certain points that are much more evident in the electrocardiogram than others.

The pulsus alternans, in which every other beat of the pulse is reduced in size, is an indication of heart failure and is undoubtedly due to peripheral causes, as it does not show in the electrocardiogram.

Sino-auricular block is merely mentioned here for the sake of completeness of the list. It accounts for certain examples of missed beats in very slow hearts.

Cardiologists dwell much on the myogenic theory and are firmly convinced that it is an important matter. Nevertheless, if they are trained clinicians and experienced practitioners, as are all the older cardiologists, they know the effect of general conditions upon the heart action and are thoroughly mindful of the influence of the vagus and the sympathetic nerves. Medical practice shows, however, that aside from fairly definite clinical conditions abnormal action of the vagus and the sympathetic nerves are temporary incidents and most of the time the heart beats of its own initiative. I have adopted the following clear statement of this matter from Flint's admirable monograph:

Gaskell answers the question as to the function of the ganglion cells in the following words: "The ganglion cells in the heart are part of the great group of ganglion cells which are situated in the course of the small-fibred efferent nerves supplying the viscera. These cells form the outlying vagrant group of nerve cells which are known by the name of the sympathetic and cerebrospinal

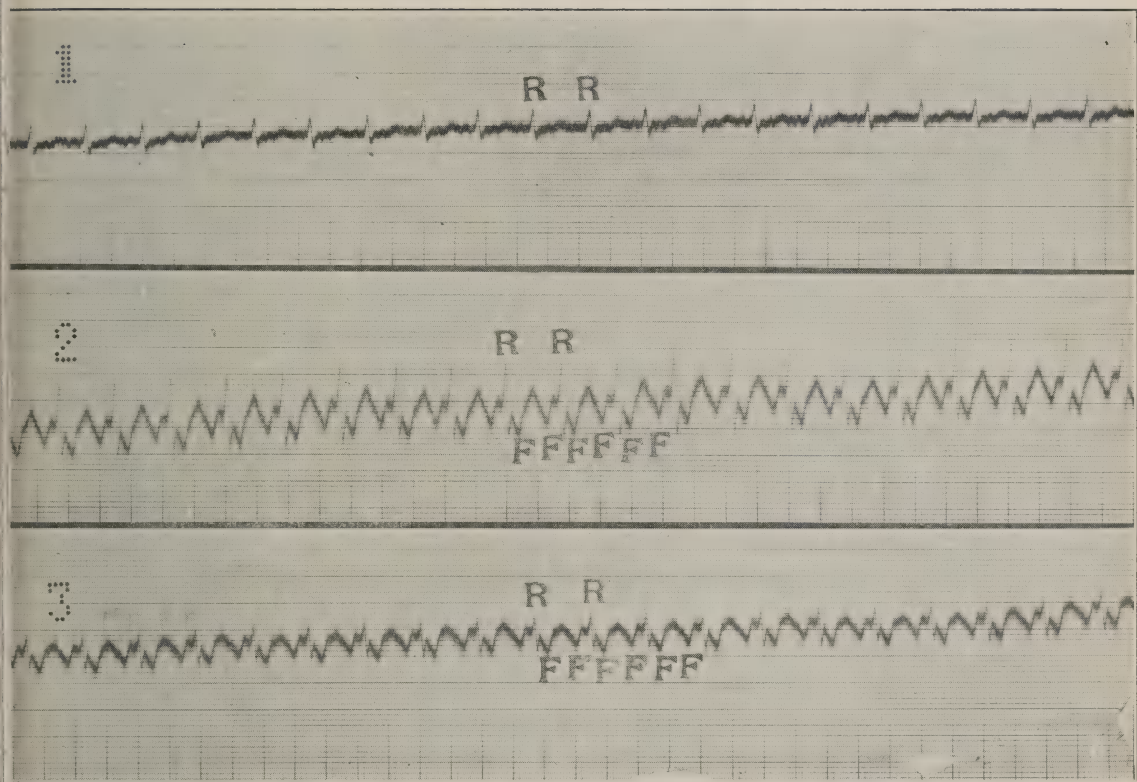


FIG. 4. Auricular Flutter

ganglia. In the case of the heart the ganglion cells are the cells belonging to the small-fibred efferent cardiac fibres of the vagus, just as some of the cells in the ganglion stellatum and in the inferior cervical ganglion are the cells belonging to the small-fibred efferent cardiac fibers of the augmentor nerve. There is no more need to assign special functions to these cells than to any other of the peripheral efferent nerve cells. They are cells connected only with the inhibitory fibres of the vagus, and as such are simply part and parcel of the mechanism of inhibition, just as the corresponding cells in the

ganglion stellatum are simply part and parcel of the augmentor mechanism."

To complete the account of the nerve supply: The Weber brothers in 1845 announced their discovery of the inhibitory action of the vagus, and described how, by stimulating the peripheral ends of the vagus nerves, they had caused the heart to stop beating. This announcement made a profound impression, as it was the first discovery of an inhibitory nerve. Schiff opposed the hypothesis of inhibition in 1849; for in his belief the vagus was a "motor" nerve, and he explained the phenomena as being due to fatigue of the heart muscle from overstimulation of the vagus. The Webers believe that the heart was supplied by two different kinds of nerve, stimulation of the which produced opposite effects, both in rate of rhythm and force of contraction, but they were unable to isolate the accelerator fibres. In 1863 Von Bezold, by dividing the spinal cord in the upper thoracic region and stimulating the cervical cord, showed that the accelerator fibres in mammals leave the cord in the region of the first thoracic ganglion of the sympathetic system. Cyon showed that this acceleratory effect was abolished by destruction of the ganglion stellatum. In 1870 Schmiedeberg and Ludwig found that stimulation in the frog of the trunk of the vagus nerve after application of nicotine to the heart produced an acceleration, and they concluded that the vagus contained accelerator fibres, but it was not until the following year that they traced out the course of the accelerator fibres in the dog, and were able to prove that the effect on the heart of sympathetic nerves was opposite to that of the vagus nerves.

That stimulation of the roots of the vagus as it leaves the medulla gives a pure inhibitory effect was shown by Gaskell also, and that stimulation of the sympathetic fibres between the anterior roots of the third nerve and the vagus ganglion gives pure augmentor and accelerator effects. He thus proved that the accelerator fibres join the vagus in its course, and thus explained the results obtained by Schmiedeberg and Ludwig after applying nicotine to the heart.

Gaskell, whose classification of the functions of the heart muscle is so wonderful, sums up the effect of vagal action in the following words: "Such, then, are the primary effects of stimulation of the vagus nerves: depression of rate, depression of excitability, depression of contraction force, depression of conductivity, and increased positivity of the muscular substance."

In 1913 Cohn and Lewis showed in vertebrates that, while

stimulation of the right vagus slows the heart more than does stimulation of the left, yet the matter has a greater effect in depressing the conduction of the stimulus in its passage from auricle to ventricle through the a-v node or bundle. This result is of considerable interest developmentally, since the stimulus upon which contractions depend arises in the sino-auricular node at the mouth

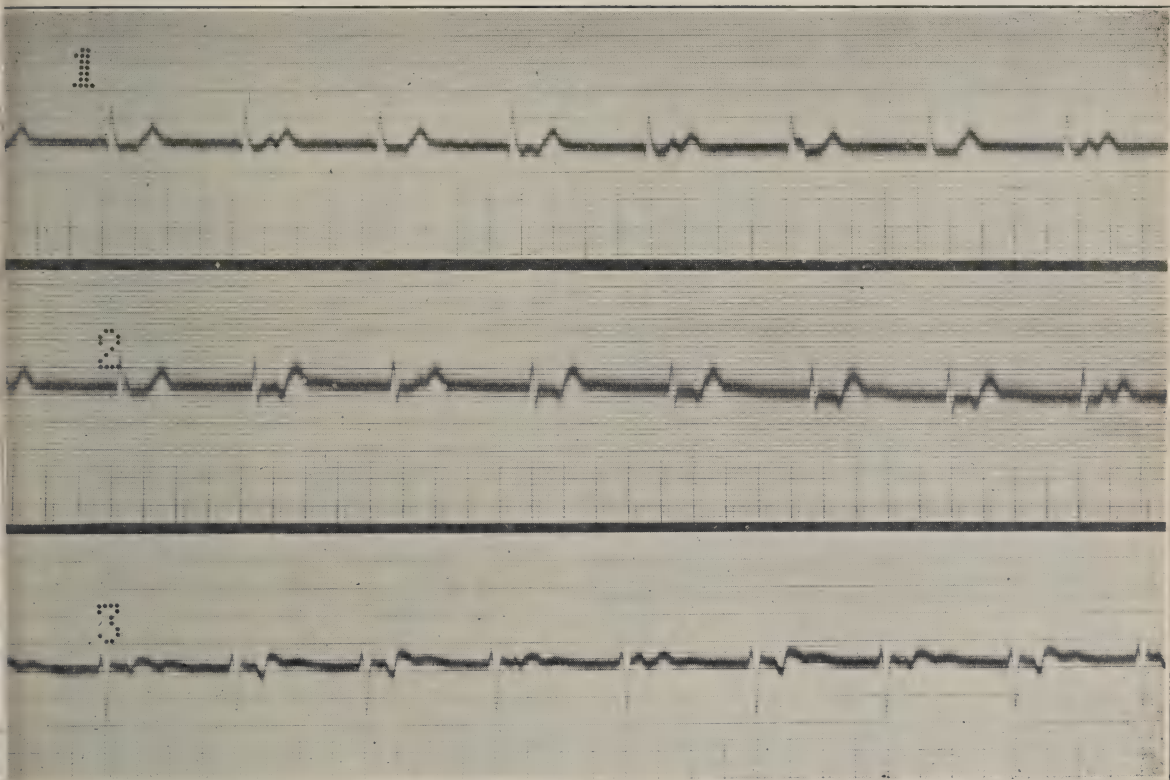


FIG. 5. Nodal Rhythm

of the superior vena cava, whilst the auricular node from which the a-v bundle takes origin lies near the opening of the coronary sinus; these two veins represent respectively in the embryo the right and left ducts of Cuvier. Upon the recognition that stimulation of the vagus depresses the function of conductivity, especially that of the a-v bundle, depends the treatment of cases of simple paroxysmal tachycardia, auricular flutter and fibrillation, by digitalis. This drug, by stimulating the vagus nerves, depresses the conductivity

of the a-v bundle, and so, by reducing the number of stimuli which are allowed to pass to the ventricle, relieves the ventricle of unnecessary and useless work. It should be noted that slowing of the ventricle cannot be effected through the action of the vagus on the sino-auricular node, because the stimulus which gives rise to the abnormal rhythm is ectopic, and the s-a node is no longer the pace-maker of the heart.



FIG. 6. Fibrillation

The effect of stimulation of the cardiac branches of the sympathetic (*i.e.*, the augmentor and accelerator fibres) is exactly opposite to that of stimulation of the vagus. It is interesting to notice that if the a-v bundle is so clamped that the ventricle responds only to every second auricular contraction and if the accelerator fibres are then stimulated, the conductivity of the bundle is increased, and the ventricle will respond to each auricular contraction.

The "depressor nerve" was first discovered in the rabbit by

Cyon and Ludwig in 1886. This nerve consists of efferent fibres which take origin mainly in the first part of the aorta. Stimulation of the peripheral end is without effect, while stimulation of the central end lowers the general blood pressure. The heart in this way is protected from having to contract against too great an arterial pressure. Thus, then, the stimulus to contraction originates in the heart itself, but the rate of the heart is controlled by the central

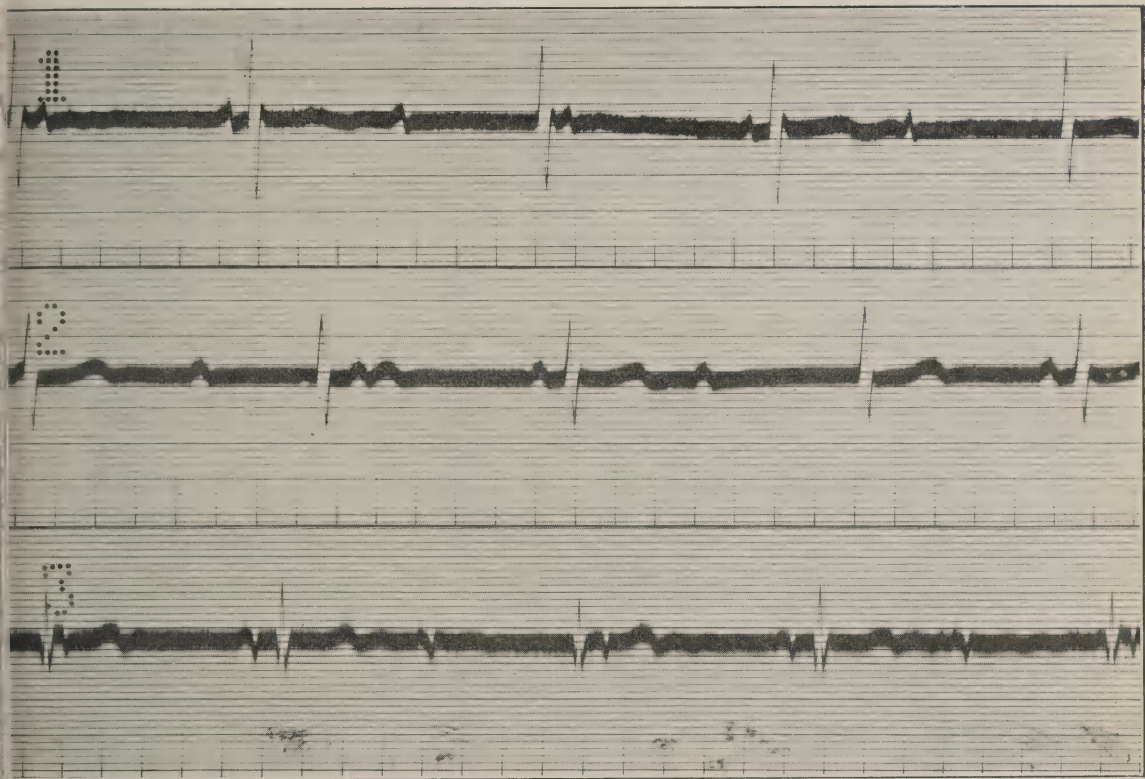


FIG. 7. Complete Heart Block

nervous system, whereby it is informed of the needs of the body for blood. The heart can be compared to the engine of a motor food-supply van: It keeps going so long as it is supplied with its source of energy—*i.e.*, petrol (blood)—but is controlled by the driver (nervous system) according to the need of the population (tissues of the body).

In conclusion: The problem of the care of the irregular heart can be divided between the neurological and the muscular basis—

between cardiology and neurology. This is well illustrated by that great problem of the care of the apparently increasing number of persons who suffer from Graves' disease. Here, primarily, the symptoms pertain to the effect of the nervous system on the heart. Later the heart may give out as a muscle and become an essential problem for the cardiologist. While the neurolo-

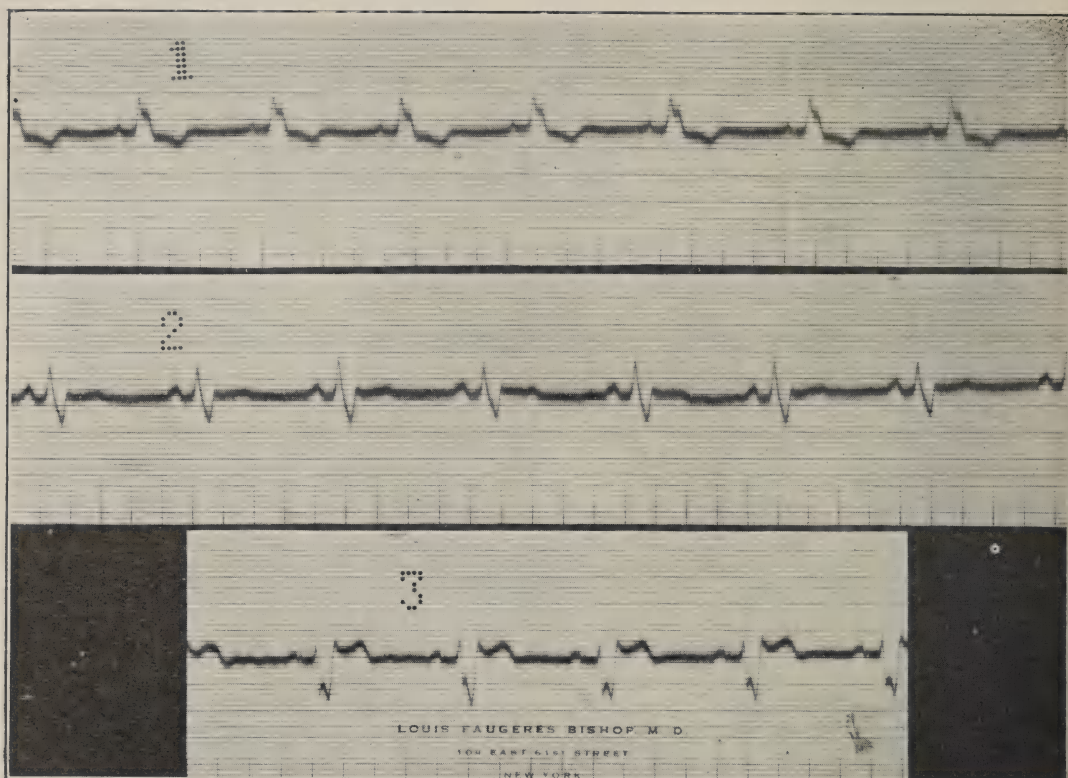


FIG. 8. Intraventricular Block

gist is perhaps wiser than the cardiologist in the management of the nervous system, he often is unmindful of the changes taking place in the heart that are revealed by the fluoroscope and the electrocardiograph. There should be close coöperation between the two specialties in this work, for a person with Graves' disease should have a recorded technical examination of the heart so that it can be intelligently watched under the great strain to which it

is subjected. If the cardiologist and neurologist would divide this problem between them it would be much better for the patient than at the present time when one or the other handles the case exclusively. Both cardiology and neurology are too elaborate and different fields of knowledge for any one man to be completely trained in both. About one-half of all cardiac irregularities need the additional light of neurology.

THE SIGNIFICANCE OF PSYCHOPATHOLOGY FOR GENERAL SOMATIC PATHOLOGY

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The questions of the nature of the mind and the relations of mind and body are perhaps as old as medicine, and the latter at least has been the subject of untold discussions and theorizing. I have undertaken to show elsewhere ¹ that by mind is meant total reactions. The ultimate nature of anything is impossible to compass, but mind, mental, and psychological are terms used to express those reactions of the organism which are total in character. Whenever we speak of the reactions of the organism as a whole, whenever we express what the organism as a biological unity is doing as such a unity, we necessarily are forced to the use of terms which are psychological.

I have also emphasized ² that, from this point of view, namely, that *mental reactions are total reactions, the mind is as old as the body*, has a past of equal length and significance; and, because it is only one aspect of the individual as a whole, that the discussion of the relations of mind and body implies a separation which does not in fact exist and that therefore the body-mind problem is not a real problem at all but, as I prefer to call it, a pseudo-problem.

From this point of view, therefore, any circumstance or condition of the organism may be viewed from the psychological as well as the somatic angle; and the organism as a whole, in reference to any such circumstances or conditions, may present as well a psychological as a somatic aspect.

The fact that for the most part, in the past, it has been the somatic aspect that has attracted attention rather than the psychological, is due to factors and reasons that it is not my intention to discuss at this time. I desire only to emphasize that it is no longer sufficient to think only of the somatic factors in an organism that is integrated to function as a whole, but that the psychological components are as much a part and parcel of the various circumstances and conditions as the somatic and therefore entitled to at least as

¹ Foundations of Psychiatry. Nervous and Mental Dis. Mon. Series No. 32. Introduction to the Study of Mind. Nervous and Mental Disease Mon. Series No. 38.

² Loc. cit.

much consideration. In fact I shall attempt to show how a consideration of these psychological components is capable of throwing light upon conditions that otherwise seem impossible of explanation, in the same way, at least, that a broad survey of a field will often disclose the meaning of minor details that would be without meaning if noted by themselves alone because the broad survey discloses their relations to the whole and it is as related parts alone that they possess meaning.

There have always been, in the history of medicine, numerous examples of the so-called influence of mind on body. Many of the examples cited have been very dramatic and mysterious, as for example the instances of hysterical stigmata, the bloody tears, marks of the nails on hands and feet corresponding in locality to the wounds of Christ, and instances of blisters produced by suggestion the result of the application of a metal said by the hypnotizer to be red hot. I do not propose to discuss these, as obviously they for the most part occurred under conditions that do not lend themselves to an understanding of just how they might have come about. No doubt they were often the result of self-inflicted wounds which the superstitious state of mind of the observers made it impossible for them to interpret in this way.

I have in mind the experiences of many psychotherapists that certain physical symptoms get better or clear up entirely as the result of psychotherapy alone, as the sort of observations that have led to a consideration of this whole subject. Some of the instances are, too, perhaps, not explainable by our present knowledge, but at least they have served to direct attention anew to the whole problem but from the new and broader point of view indicated.

The difficulty has been in the past that what was psychological has been thought of too much in terms of ideas and psychological reactions in terms of language, while reactions at the psychological level that went over into conduct were thought of in terms of facial expression and the voluntary musculature. Mind has been thought of too much as receptive and too little as emissive; and mental reactions were taken too much at their face value as formulated in language and there was too little appreciation of the value of other forms of expression, particularly by means of the unstriped muscles and vegetative nervous system. There has been very little appreciation of the possibilities of interpreting the psychological component by interrogating visceral functions or bodily attitudes, while purpose as it may outcrop from such situations has been too often minimized by damning it as teleological.

It is my belief that the time has come when it may be profitable to reconsider this whole field, to gather pertinent clinical facts that have been disclosed by the modern methods and to see if a new point of view, such as I have indicated, may not result in a better understanding of such facts and an appreciation of their meaning, especially if they can all be tied together by an hypothesis that sufficiently accounts for the facts and which, too, is pregnant in suggestion for further investigation and interpretation in still unexplored territory.

The starting point that I shall take will be the principles already indicated and elsewhere elaborated,³ namely, that the psyche is an expression of the organism as a whole and therefore the psyche is as old as the soma and has the same extent of history and development. So long as we discuss the functions of the parts of an organism we are in the region of physiology; so soon as we discuss the functions of the organism as a whole we are in the region of psychology.

From this point of view it is evident that inasmuch as each part of the organism, each organ, goes into and helps form the organism as a whole, is one of the parts the integration of which forms the whole, that each part, each organ, must contribute something to the final pattern of the whole, must, in other words, in some way be represented in the psyche, must subtend a certain psychological component. For every disease, or for that matter for every state of the organism, there must be, therefore, as well a psychic as a somatic component, which means among other things that when looked at from the point of view of its parts as integrated it presents psychic factors.

The conception implies psychic as well as somatic determinism, quite necessary postulates, as otherwise we have to admit chance, which means that in the region where chance is operative no explanation will ever be reached. Apart, therefore, from any theory of individual determination, "free will," or determinism in a metaphysical sense, the belief in determinism in the psychic sphere as well as elsewhere is essential to progress for without that belief there would be no incentive to further inquiry. Aside, therefore, from its metaphysical bearings, determinism is a pragmatically necessary assumption.

Now before entering into any hypothesis or explanation of any psycho-physical correlations I may say to begin with that they have been noted time and time again through the ages but that I shall not

³ Loc. cit.

consider here any example before those noted in connection with psychoanalysis.

Of course the most obvious of the apparently physical disabilities to be explained psychologically are those the result of conversion hysteria. Here is a long list of symptoms a great many of which, the paralyses and anesthetics, have long been more or less well recognized as of psychogenic origin, to the extent at least that they were known to be hysterical. Even less obvious symptoms, such as paralyses and anesthetics in the distribution of the cranial nerves, facial palsies, blindness, ageusia, deafness, have been recognized as hysterical, as have also still more obscure symptoms such as the false pregnancies and phantom tumors. While such symptoms as these have long been recognized as hysterical in origin, their mechanism has only recently come to be understood as a result of the work of the French School in which Janet is the most notable figure, and more recently of the Psychoanalytic School in its study of the phenomena to which it gave the name of conversion hysteria.

Aside from such symptoms as these, that are generally accepted to be hysterical and therefore psychogenic in origin, there is a host of other symptoms that are usually classified as psychoneurotic or more generally as functional, that are not hysterical in character and not by any means so obviously psychogenic. These symptoms include all sorts of manifestations of disordered function of the various systems of organs—the circulatory, gastro-intestinal, genito-urinary, respiratory, cutaneous, and neuro-muscular—and include also such more general symptoms as insomnia, headache, vertigo, and, in general, neurasthenia.⁴

If we look for further light in this territory, especially for an understanding of mechanisms, we will find that a very considerable group of cases that used originally to be classed altogether under the very general term psychoneuroses or functional neuroses are found to belong to the anxiety neurosis as Freud first described it, and also as it has come to be thought of more recently, that is, as containing far more psychogenic material than Freud originally thought. In Freud's original description⁵ of anxiety neurosis as an actual neurosis, as distinguished from a psychoneurosis, he included as symptoms cardiac arrhythmia, tachycardia, dyspnea, asthma-like attacks, profuse perspiration, trembling, inordinate appetite, diarrhea, vasomotor

⁴ See Dejerine and Gauckler. *The Psychoneuroses and Their Treatment by Psychotherapy*. Tr. by S. E. Jelliffe. Lippincott, Philadelphia, 1913.

⁵ Jelliffe and White. *Diseases of the Nervous System*. Lea and Febiger (4th Edit.), Philadelphia, 1923.

neurasthenia, paresthesias, vertigo. These symptoms were explained as due to a "free-floating anxiety" which originates at the physiological level of function but which may attach itself to anything that is handy, including ideas, and therefore appear to be of psychic origin.

If we turn to Stekel,⁶ who definitely believes in the psychic origin of the anxiety neurosis, or anxiety hysteria as he prefers to call it, we will find a similar comprehensive list of symptoms traceable to anxiety; namely, symptoms referable to the heart, to the respiratory system, the gastro-intestinal system, fainting, vertigo, trembling, parasthesias, vasomotor phenomena, disturbances of nutrition, cramps, pains, sleeplessness. All these he believes due to an inadequate, unsatisfactory sexual expression, or, in other words, they are of sexual etiology.

Adler, in a fascinating hypothesis,⁷ which unfortunately has not as yet been adequately developed, believes that a "feeling of inferiority" is at the basis of the neuroses and that this feeling of inferiority is dependent upon an inferior organ or organs that are not, therefore, up to full functional capacity. The implication that an inferior organ subtends a psychic inferiority in that region contributed to by the organ in question fits in well with the "organism as a whole" point of view and my elaboration along these lines.

Kempf⁸ attempted the explanation by a more dynamic formulation in which he attributes to the strivings, not so much of the separate organs, but of the body segments, a rivalry for the control of conduct and so the gaining of satisfactions. The rebellious segment must be fought and conquered by throwing it out of gear (repression) and the symptoms are traceable to its efforts to "come back."

Later Freud came to a full recognition of the importance of the organic and discussed the whole subject of the investment of organs with libido under the general caption of narcissism or narcissistic libido. This conception was immediately applied to conditions previously not understandable in the terms of the original libido theory, particularly to the malignant schizophrenias by Freud, to the tics by

⁶ Stekel, W. *Conditions of Nervous Anxiety and Their Treatment*. Dodd, Mead & Co., New York, 1923.

⁷ White. *The Adlerian Concept of the Neuroses*. *Jl. Abnorm. Psychology*, August, 1917. Adler. *Organ Inferiority and Its Psychological Compensation*. *Nervous and Mental Disease Monograph Series No. 24*.

⁸ Kempf. *The Autonomic Functions and the Personality*. *Nervous and Mental Disease Monograph Series No. 28*; critical review by White. *The Psychoanalytic Review*, January, 1919.

Ferenczi,⁹ and to paresis by Hollós and Ferenczi.¹⁰ This whole question of the libidinal investment of organs has come to be of great importance in the understanding of these conditions and of the classical hypochondria in its various forms. The understanding of this subject will, of course, go a long way in assisting in the differentiation of functional from organic conditions and towards developing a rational therapy.

Rank¹¹ sees in all these symptoms anxiety as fundamental. Birth for the first time seriously upsets the libido equilibrium and effort is immediately exerted to its restoration. The first object of libidinal investiture is the mother, and the mother is, therefore, looked to as a means of restoring the equilibrium. Libido is thus originally and fundamentally mother libido, and the gaining of mother libido becomes at once the chief business of life and in fact remains so. The upsetting of libidinal equilibrium produces anxiety; the mother is sought, at first actually, later symbolically, to restore that equilibrium. Life becomes, therefore, a series of anxiety states, and success is the result of being able to find mother libido at an acceptable social level. All the symptoms previously maintained are explained by him as symptoms or expressions of anxiety.

Thus we see conversion hysteria, anxiety-neurosis, anxiety hysteria, tics, hypochondria, neurasthenia, as representing the catalogue of conditions in which somatic disorders are dependent upon psychogenic factors. In a general way the psychogenesis of these conditions has been known for a long while. Janet, for example, made most important contributions to the understanding of hysteria, and to proving hysteria to be a psychic disorder, but it was psychoanalysis that was finally able to answer, with some degree of satisfaction at least, why the neurosis or psychosis took the particular form it did, to explain, much more fully and in detail, both the mechanism and the content.¹²

If the explanations of the psychoanalysts of this group of cases were examined it would be found that they all make use of the well-known psychoanalytic mechanisms, particularly distortion mechanisms, as applied to material occupying the personal unconscious, that is,

⁹ Ferenczi, S. *Psychoanalytic Observations on Tic*. *Internat. Jour. of Psycho-Analysis*, March, 1921.

¹⁰ Hollós and Ferenczi. *Psychoanalysis and the Psychic Disorders of General Paresis*. *The Psychoanalytic Review*, January and April, 1925.

¹¹ Rank, O. *Das Trauma des Geburt*. *Internat. Psychoanalyt. Verlag*, 1924, and *Entwicklungsziele der Psychoanalyse*, soon to appear in English translation in the *Nervous and Mental Disease Monograph Series No. 40*.

¹² Northridge, W. L. *Modern Theories of the Unconscious*. E. P. Dutton and Co., New York, 1924.

material that represents actual past experiences of the individual. Some tendency which may not have nucleated in an actual experience, or existed psychologically only as phantasy, is repressed. Where something occurs that threatens, through association, to make the repressed material or tendency conscious, anxiety occurs and attaches itself to whatever is present, to the stimulus that stirs the unconscious complex. Such symptoms as tachycardia, sweating, dyspnea, diarrhea, dry-mouth, nausea and vomiting, hyperchlorhydria, trembling, weakness, are all easily understandable in this setting as belonging to the general state of anxiety which accompanies the repressed material but is now reflected or projected upon the stimulus that threatens to make the repression ineffective. The key to the particular organic distribution of the anxiety will be found in the circumstances of the repressed experience: anosmia and disgust associated with bad odors; amblyopia or dimness of vision with terrible sights; deafness or an auditory aura when the repressed experience had a sound as an important part of it, like the report of a pistol, an explosion; anesthetics affecting erogenous zones, and so on indefinitely.

In addition to the above types of cases and explanations the psychoanalysts recognize that existing somatic disease which is not of psychogenic origin may be taken hold of, so to speak, and used by the neurosis. A neurotic with a feeling of inferiority, if required to submit to an amputation, would be quick to seize upon this mutilation to enhance and justify his feeling of inferiority; a beautiful girl with a tendency to regression would be pretty certain to have this tendency dangerously lighted up by an accident that disfigured her face—there would be no further reason for keeping up the fight; failure of all sorts, somatic as well as psychic and social, is seized upon to warrant further slumping and self-indulgence in the satisfactions of regressive tendencies.

All these concepts are exceedingly valuable and have proved very useful therapeutically, but to my mind they fall far short of plumbing the depths of the subject. The explanations, inasmuch as they rest upon personal experiential material, are relatively superficial. They are based upon the concept of the unconscious as developed by Freud and which may be termed the personal unconscious, rarely upon the racial or collective unconscious of Jung. And, too, these explanations do not take into account sufficiently the organism-as-a-whole concept but tend, by implication, to preserve the dualistic conception of body and mind. I shall try to make my meaning, in respect to this last statement, somewhat clearer.

If we assume that "mental" is only another way of stating

"total" reaction, and that therefore, inasmuch as there have always been total reactions, all the way up the evolution ladder, there must always have been what we know as psychological phenomena wherever there was life, then, as I have phrased it, the psyche is as old as the soma. If I use psyche in this broad sense then it can be seen that unconscious has a much more profound significance than the personal or even the racial unconscious, namely, that it consists of the total psyche as it has been preserved in the psychological structure of the individual from the very beginnings of life just as the anatomic structure likewise preserves the historical records of the total soma from the time life began. We must also assume that for every stage of development, not only personal, not only racial, but for every stage in biological development, just as certain motor responses were characteristic, so certain psychic responses or total reactions were also characteristic. In other words, that for each stage certain structures and functions were characteristic and as well psychological as physiological functions, and that structure and function, physiology and psychology, are interrelated, integrated, and interdependent. The organism has developed as a whole, all parts, structures, and functions advancing together or retarded together, but always related so that each is, of necessity, appropriate to the other.

The application of this more extensive concept of the unconscious as not only containing the records of the past for the years of the individual's life, but the records of the past of the millions of years of life as it has struggled forwards and upwards from its very beginnings until the present, has only recently been attempted. Groddeck discussed the psychoanalytic treatment of organic illnesses at the Sixth International Psycho-Analytical Congress at The Hague in 1920, while in this country Jelliffe¹³ has for some years and most persistently attacked the problem, and he and I together, in our Textbook,¹⁴ have attempted to build up a consistent dynamic pathology of disease.

A generation ago only pathology was a study of the dead body; its concepts were formulated in the "dead house" and at the autopsy; it was structural only. Then slowly there crept into these static concepts the idea of function, and now pathology has cut loose pretty successfully from its exclusively structural moorings and realizes the importance of function. Now the next step will be to see the

¹³ He has given a very excellent statement of the case in his most recent article. Jelliffe, S. E. *The Neuropathology of Bone Disease. A Review of Neural Integration of Bone Structure and Function, and a Suggestion Concerning Psychogenic Factors Operative in Bone Pathology.* *Trans. Am. Neurol. Assn.*, 1923.

¹⁴ Jelliffe and White. *Diseases of the Nervous System.* Ed. 1-4. Lea and Febiger, Philadelphia, 1915-1923.

organs, not separately, as they are successively removed from the body at autopsy and carefully weighed, measured, and otherwise examined, nor even to understand them physiologically as the pathologist refers to the digest accompanying the case and to the results of the several functional tests conducted during life, but as they exist, not in themselves alone, but as integrated portions of the organism as a whole. We would introduce the psychic component into the study of disease, make pathology three dimensional, and extend our concept beyond the confines of the individual to include all life, for like the exponents of relativity we would include time as a fourth coördinate.

This introduction of what I have called the *time coördinate* into the field of medicine in general and of psychiatry in particular is illustrated in the known vulnerability of inferior organs, that is, of organs defective in development or relatively infantile in anatomic make-up as compared with the more usual, so-called normal, or adult type of organ, and the relative malignancy of tumors of embryonal tissue characteristics. It would seem here that the organs or tissues in question failed in not having come up to a standard that implied that they had acquired the maximum results of past experience as laid down in structure. An inquiry into the bearing of the time factor as thus displayed in structure and function relates these organs and their functions to more primitive types in the biological scale or evolutionary phylum, and is at the basis of the historical method and, too, of the comparative method of scientific inquiry.

If we will consider the individual in this way, as possessed of an unconscious that contains the psychic precipitate of millions of years of experience (mneme) as the body contains that experience laid down in structure, we will get a new and very stimulating and illuminating slant upon many problems that now are quite obscure.

Where will this way of thinking lead us? And to what purpose? Let us follow it sufficiently to see!

In the first place it is evident that the concept organism-as-a-whole cannot refer solely to the body but must include the mind. Mind and body are not separate and distinct, but only different aspects of the organism; nor are they related to a third reality like a man and his shadow; nor yet are they related by a constant process of give and take like the city and the river. The age-long distinction of mind and body has been built up largely as the result of metaphysical speculation until finally a pseudo-problem has been created which is difficult to deal with. My suggestion is that the most practical way to deal with this situation is to regard them as two aspects of the

organism, like two faces of a crystal which may be considered separately or as related to the entire structure.

The meaning that immediately emerges from looking at mind and body as but two aspects of the organism is that *for every situation there is as well a psychic as a somatic aspect*, or, as there is no controversy about the latter, that every situation, for our purpose, *every disease, has a psychic component*, and further, that this component has a history as long and as important for its understanding as has the somatic component. It is only since the advent of the theory of evolution that the importance of the past for the understanding of the present has been appreciated. Heretofore, however, the importance of the past has only received a partial acknowledgment by somatic pathology. We are now beginning to learn that it has an equal importance for psychopathology.¹⁵ This concept in its length, breadth, and thickness, that is, in all that it implies, is really revolutionary and to my mind may easily be the most important thing to happen to medicine in many a day. It means no less than that, for an adequate understanding of any present situation the entire past, which necessarily includes the past of the psyche, must be understood. The present does not stand alone, it emerges from the past.

The working out of this idea is naturally very difficult and involves the understanding and unravelling of conditions that have become extremely complex. The general formulation of the problem has been ably stated by Jelliffe,¹⁶ while its detailed application to several actual somatic disease conditions has been attempted by several. Mühl¹⁷ has attempted an analysis of the personality trends in pulmonary tuberculosis, Lewis¹⁸ has approached the problem by a study of the extraneural pathology of the psychoses, while the essay of Hollós and Ferenczi¹⁹ already referred to is a brilliant example of what can be done in this difficult and obscure territory of what they aptly refer to as the stereochemistry of the psyche.

The lines of thought here suggested lead one as far as possible from the old idea that regarded the human organism as a closed system, self-determining, and morally responsible, all largely meta-

¹⁵ See my *The Comparative Method in Psychiatry*. JOUR. NERV. AND MENT. DIS., January, 1925.

¹⁶ Jelliffe, S. E. *Paleopsychology. A Tentative Sketch of the Origin and Evolution of Symbolic Function*. THE PSYCHOANALYTIC REVIEW, April, 1923.

¹⁷ Mühl, A. M. *Fundamental Personality Trends in Tuberculous Women*. THE PSYCHOANALYTIC REVIEW, October, 1923.

¹⁸ Lewis, N. D. C. *A Discussion of the Relationship of the Chemical, Physical, and Psychologic Aspects of the Personality*. THE PSYCHOANALYTIC REVIEW, October, 1924.

¹⁹ Loc. cit.

physical concepts which grew out of contemplation rather than experience.

Before I pursue this thought any further I will be somewhat more specific in the matter of actual pathology, and in doing so I wish to call attention to an essay by Maeder²⁰ on psychopathology and general pathology, which, so far as I know, is the only previous attempt to deal with the subject I have undertaken in this paper.

Maeder cites the situation in which, in the midst of a mental conflict, a bodily disease—pulmonary tuberculosis—develops. It is assumed that what has happened is that the girl's reproaches of an unfaithful lover have, so to speak, turned inward and become destructive self-criticism, renunciation of life, self-hatred, and self-destruction, or what I call in such a situation an attenuated suicide. Now it would seem that here the psychic component is of greater importance than the somatic component, for the patient remains ill so long as the mental conflict endures, but gets well when and only when that clears up.

He makes a very important observation with reference to the type of individual who develops physical disease as a result of mental conflict. He says in the first place that the bridge between the mental and the physical is the affect, with which statement I should think there would be general agreement, and adds that it is the extravert, whose adaptation is mainly through feeling, who is particularly liable to discharge mental conflicts through physical pathways. He gives, as an example, gastric ulcer.^{20a}

Chronic disease mobilizes all the primitive and negating trends which have not found a proper place in the development of the character, and thus are organized a group of psychic factors which ally themselves with the bodily disease. He mentions, in addition to such as have been already suggested in the instance of the tuberculous girl, lack of faith in doctors and the prevalence of quackery.

He draws many analogies between mental and bodily mechanisms. In both, pathological processes may be predominantly degenerative or may be defensive and show attempts at healing. Melancholia he puts down as a manifestation of a destructive tendency. Repression is a defense reaction which, like immunity, is, within limits, a provisional method of safety. Indifference, defiance, negativism, may isolate a disease process by repression or projection like a diseased

²⁰ Maeder, A. Psychopathologie und allgemeine Pathologie. *Zeitschr. für die ges. Neur. und Psychiat.*, Bleuler Festschrift, 1923, 82, 176, ably abstracted by M. R. Barkas in the *Jour. of Ment. Sci.*, July, 1924.

^{20a} See also here Jelliffe and White (4th Edit.), p. 174, fig. 58 of Duodenal ulcer resulting from psychical conflict.

bodily area is encapsulated or amputated. In the concentration of forces on defense resistance or immunity results—mental alexins. Lysis is the process of dissolving the superseded organs or mental attitudes—mental lysis. Tissue overgrowth in granulations, lasting production of immunity, healing carried beyond mere defense to reconstruction occurs in the body; reintegration, healing and new development may also be manifested in the mind and personality.

Finally he believes that replacement, renewal, regeneration, products of the creative agent leading to growth and development, are limited in the body by material and structural boundaries but that in the psyche the scope is broader. Psychoneuroses and the functional psychoses are essentially due to deviations and inhibitions of development. Regeneration, restitution, and the continued integration of the personality are the essential elements of healing.

Apropos of this last point, namely, that the scope for development is greater in the psyche than in the body, I would call attention, in passing, to two important recent works that discuss this whole matter and strongly confirm Maeder in this opinion. The work of Child²¹ on the physiological foundations of behavior discusses at length the problem, from a physiological standpoint, of the modifiability of pattern in general and of excito-motor behavior in relation to general organismic pattern. This discussion is based upon the results of his work of many years out of which has developed his theory of dynamic gradients as the basic factors in organismic pattern and the description of the organism as a behavioristic pattern in a protoplasm of specific hereditary constitution.²² The companion book, if it may be so called, by Herrick,²³ deals with the neurological foundations of animal behavior, that is, with the structural background of behavior. He also deals with the problem of modifiability, discussing the apparatus of modifiable behavior. His book is an examination of the dominant integrating tissue, the nervous system, and he shows how vital for the possibilities of the modification of behavior pattern was the advent, in the evolutionary phylum, of the synaptic type of nervous system.

With this interpolation of the confirmatory evidence of Child and Herrick, I will go on to state that which I had originally intended to,

²¹ Child, C. M. *Physiological Foundations of Behavior*. Henry Holt & Co., New York, 1924.

²² See my *Significance for Psychotherapy of Child's Developmental Gradients and the Dynamic Differentiation of the Head Region*. *THE PSYCHOANALYTIC REVIEW*, Vol. V, No. 1, January, 1918.

²³ Herrick, C. J. *Neurological Foundations of Animal Behavior*. Henry Holt & Company, New York, 1924.

namely, that Maeder's statements might very easily be taken for a series of very pretty analogies and so his whole argument would be minimized to the point of extinction, except for the fact that so many apparent likenesses might readily be suspected of meaning a real likeness and, of course, the therapeutic results which are naturally exceedingly difficult to make convincing except by experience. It occurs to me, however, that the whole argument can be strengthened by a restating in somewhat different form, and it is this statement of the case, so to speak, that is the main object of the paper.

In order to make this statement as clear as possible, I will restate the general principles so far formulated. They are: *the necessity for considering the organism as a whole—the psyche is as old as the soma*, and that *for each situation there is as well a psychic as a somatic component*.

If we start from this synthetic standpoint rather than the analytic, which is the one generally in use by medicine, we come to an entirely different concept of the human individual, and it is my contention that one of the great values of this point of view is just because of this fact. Medicine has now been proceeding for some considerable time in the direction of increasing specialization, which means a further and further division of the individual into territories for special study and investigation. Whether this method has exhausted itself, whether it has reached its best results, and whether it may not be on the verge of becoming sterile for further advance, I do not know; but I do feel that the time is here for a new point of view, a new direction of medical thought, which will be rejuvenating in its effects, particularly in the consideration of the great silent areas of medical research. I am convinced that many problems that have long resisted the analytic method will show signs of capitulating in face of the synthetic.

The first thing this synthetic approach does for us is to recombine the organism, which had been split by the specialties, into a coherent, coördinated, integrated whole. In such a whole nothing can be trivial, nothing insignificant. When it is realized that most of the bodily organs represent the structuralization of millions of years of experience the respect for them and what they stand for in the organism as a whole will increase.

It is easy to understand how a considerable disturbance of one of the vital organs will seriously upset the whole individual but the ramifications of the functions of the organs of lesser importance are usually not seriously considered, as witness the nonchalance with which they are removed. An analogy may serve to bring this point

home. What would happen, for example, in this automobile driving age, if some surgeon should cut rubber out of the social organism? We can, perhaps, form some idea of the amount of personal and social readjustment that would take place. Let us consider briefly somewhat more important or less well known organs. Take nitrogen. What would happen if nitrogen were removed? In the first place, war, as at present understood, would be impossible because all the high explosives depend, for their power, upon nitrogen. Just this alone gives a faint idea of the revolution in the social organism that would be necessary if nitrogen were removed, to say nothing of ramifications in the field of medicine and surgery and in the industries and its supreme importance in plant growth. When we come to a social organ like the coal industry the average person can only be appalled at the consequences of a failure of the coal supply, and yet the average person probably has little conception of coal other than as a source of heat. The enormous number of substances that are produced from coal, particularly the coal tar products, the oils, dyes, drugs, chemicals, find their way in every direction throughout the whole social fabric, and no man would be so rash as to even attempt the prediction of what would happen as a result of a failure of the source of supply. Cottonseed is a similar, but less known, instance. Few realize the multiplicity of products, clothing, rope, writing paper, powder, varnishes, artificial silk, fuel, fertilizer, feed, oil, that comes from this source. The ramifications are of enormous complexity, but because unknown the social surgeon might undertake their removal with unpredictable and not understandable consequences. We have some historical evidence to indicate what might be the result of a serious attempt to destroy social institutions founded in ages of tradition, such as the Church, the Law. The result has been chaos, a breaking down and disintegration (dedifferentiation) of the social structure before a new structure could be built up (rejuvenation).

These illustrations give roughly the way in which a synthetic approach to the individual must, of necessity, lead us to think of him and of the relations his various parts—organs and functions—bear to the whole organism.

This analogy shows up very clearly one very serious type of error in medical thinking from which psychopathology, particularly, has long suffered. For instance, if something should happen to the automobile industry we would not look alone within the confines of this industry to find the effects. There are only comparatively a few people here who would be affected, but the whole social situation might easily be very much involved. In psychopathology we have

insisted upon looking *only* in the brain for pathological changes. The rest of the body offers quite as promising a field.²⁴ In fact it is just these outside effects that interest us here, that is, the effects of the mind upon the body and the body upon the mind, to drop into the usual way of expression.

This usual method of expression, however, carries with it all the traditional errors of considering the body and the mind as two mutually exclusive systems. When the effect of one upon the other has been discussed it was from the standpoint of two systems and also from the standpoint of the etiological factor which was looked for in one of the systems. For example, a disturbed digestion produced a mental depression. The etiology was physical. A hysteria produced a paralysis. The etiology was psychic.

From the standpoint of this paper it must be evident thus far, and will be increasingly so as we proceed, that this is altogether too simple a way to look at the situation. The most that can be said is that of course the etiological factor, if it comes from outside—infection or source of anxiety—must enter, so to speak, at some point which may be either in the bodily or the psychic portion. However, even this is too simple a statement, as we shall see when I speak more specifically of the environment. From the standpoint of the symptoms it can only be said that they throw up more prominently, or at least are more obvious, for one reason or another, as psychic or as somatic. The whole organism is altogether too closely knit together, coördinated, and integrated to be usefully considered as composed of two systems reacting, throughout only a small portion of their extent, upon each other.

We can therefore only speak of disease which is predominantly somatic or psychic, for it is always both. Such distinction as may be drawn is only useful in a practical way. From a scientific viewpoint that would encompass the whole organism it is only misleading. Still language controls us and I shall consider the problem from these two angles, hoping that this explanation will serve to make the broader meaning clear.

In the first place, one aspect of the problem needs to be disposed of at once in order to clear the way. There is no doubt but a neurotic may utilize a physical disease or disability in the service of the neurosis. A physical handicap, for example, may make it impos-

²⁴ See my *Outlines of Psychiatry*, Nerv. and Ment. Dis. Mon. Ser. No. 1, and Lewis, N. D. C., *The Constitutional Factors in Dementia Precox*, Nerv. and Ment. Dis. Mon. Ser. No. 35, and Lewis, *A Discussion of the Relationship of the Clinical, Physical, and Psychologic Aspects of the Personality*, loc. cit.

sible to take part in outdoor sports, and the inability is seized upon as a basis for decrying all athletics and exalting a sedentary life. This is a typical neurotic mechanism that destroys the individual's capacity for seeing the real situation eye to eye. This is perfectly understandable and, I take it, would not be argued. The real question at issue, however, is quite different. The question is whether a disease in either the psychic or somatic zone can be produced by etiological factors resident in the other zone, whether, in other words, bodily disorder may produce mental disease and mental disorder bodily disease.

The question put in this way can be answered affirmatively without much fear of successful contradiction. That serious bodily disease can produce a mental depression that may become pathological I think few would doubt. The obverse of this, namely, that serious mental disease, such as melancholia, may produce disturbances in bodily health, I think would also be generally accepted. Leaving out of consideration the question of whether physical disease may produce other than contemporaneous functional disturbances in the mental sphere, the real issue for consideration here is, not whether mental disorder may produce physical disorder but whether mental disorder is capable of utilizing what we generally understand as organic mechanisms in the production of such disorder. In other words, the vital question is whether mental disorder is capable of producing organic disease.

This question, whether the psyche can make use of organic mechanisms, has received almost no attention in the literature. Groddeck, already referred to, has discussed it at some length,²⁵ as Jelliffe²⁶ has done before him, in this country. Groddeck cites an instance of pulmonary hemorrhage in which he was convinced that events connected with the incest complex determined the time, place, and duration. He explained psychogenically also an instance of retinal hemorrhage. He cites the case of a woman with maldevelop-

²⁵ Groddeck, G. Über die psychoanalyse des Organischen im Menschen. Internat. Zeitschr. f. Psychoanalyse. Jg. 7, H. 3, 1921, and Psychische Bedingtheit und psychoanalytische Behandlung organischer Leiden.

²⁶ Jelliffe, S. E. Psoriasis as an Hysterical Conversion Symbolization, N. Y. Med. Jour., Dec. 2, 1916; The Vegetative Nervous System and Dementia Praecox, N. Y. Med. Jour., May 26, 1917; The Epileptic Attack in Dynamic Pathology, N. Y. Med. Jour., July 27, 1918; Psychotherapy and Tuberculosis, Am. Jl. Tuberculosis, Dec., 1919; The Psyche and the Vegetative Nervous System with Special Reference to Some Endocrinopathies, N. Y. Med. Jour., April 5, 1922; Multiple Sclerosis, the Vegetative Nervous System and Psychoanalytic Research, Am. Jl. Med. Sci., May, 1921, Trans. Am. Neurol. Assn., 1920; The Neuropathology of Bone Disease, A Review of Neural Integration of Bone Structure and Function, and a Suggestion Concerning Psychogenic Factors Operative in Bone Pathology, Trans. Am. Neurol. Assn., 1923.

ment of one breast. After a long period of psychoanalysis symmetry of development was attained. He also cites a patient with an enlarged eyeball, which symptom disappeared upon solution of the complex, reappeared and again disappeared under the same influences. Many other instances are also given which go to prove that organic symptoms may be used to protect repressed material.

Many other instances might be referred to but it seems that what is needed is a more satisfactory theory of how such things may be brought about rather than a multiplication of cases only vaguely understood. Jelliffe and I have endeavored to formulate a reasonably consistent dynamic pathology of disease²⁷ in our Textbook, in which we state that the psyche, as we know it as conscious awareness, is the end result in an orderly series of progressions in which the organism has used successively more and more complex tools (hormone, reflex, symbol) to deal with the problems of integration and adjustment. But by far the larger portion of the psyche is unconscious, and this unconscious lies much closer to the organic mechanisms than does consciousness, and the only way it can throw up in consciousness is symbolically, and the deeper the layer that thus gains expression in the thinking, feeling, and acting of the individual the more archaic the symbolization.

I may add, therefore, to the principles already formulated the further principle that *all total, that is, psychic reactions that have profoundly unconscious roots which are part and parcel of organic mechanisms throw up on the surface as archaic symbolizations.*

I have looked in vain for any satisfactory formulation of what is meant by an archaic symbol. I have attempted it quite inadequately elsewhere.²⁸ I think that the best that can be done is to think of the archaic as symbolizing psychic experiences that can never become conscious and the meanings of which can only be built up by the uncovering of like material, its comparison, and the use of the comparative method.²⁹ In this way its analogy with similar material in others, in the psychotic, in children, and in primitives, is brought out, and so the meaning will gradually emerge though it is always objective to the subject. However much the subject may take part in furnishing material for the explanation, he never feels what finally emerges as a personal possession. This means, of course, that the experiences come from very far back in the individual life—either in very early

²⁷ Jelliffe and White. *Diseases of the Nervous System*, Ed. 1-4. Lea and Febiger, Philadelphia, 1915-1923.

²⁸ *Foundations of Psychiatry.*

²⁹ See my paper, *The Comparative Method in Psychiatry*. *JOUR. NERV. AND MENT. DIS.*, January, 1925.

infancy (first six months), during intrauterine life, or as racial experience.

It would hardly seem necessary to proceed further along these lines to appreciate that I am aiming at a conception of the organism that regards it fundamentally as a going concern, not as an organic formulation that has come to rest, and further that I think of energy, not as of two kinds, bodily and psychical, but as of one kind. Body is one aspect of energy; it is what I have called energy laid down in structure or *structuralized function*. Mind is another aspect of energy. Here the process of thinking is function, and the content of thought is structure. What we are really dealing with, therefore, is the *distribution of energy* as psychic or somatic and *its differentiation* in these two spheres of activity. By differentiation here is meant its investiture of the several psychic and somatic structures.³⁰ *The final pattern of the psyche, then, at whatever level we cross-section it, is backgrounded by a specific pattern of somatic structure and energetic investiture.*

This last formulation looks as if I were fixing up a pretty rigid deterministic mould out of which no individual might hope to escape. Perhaps I am. I will not deny it, for discussion might lead into the bypaths of metaphysics. I will rather refer again to the evidence that man's high place in nature was assured by the introduction into the evolutionary phylum of certain possibilities for modification. Some of these are the synaptic type of nervous system, the cerebral hemispheres, and the symbol,³¹ to which must be added as the necessary result of these structures and their modifiable functions the capacity to profit by experience. We are not, therefore, dealing with a closed system, but a system into which modification may creep at any time. Pragmatically the important thing is to know where to attempt to enter with a therapeutic program, and how much can be hoped for.

Here I am tempted to point out certain analogies. Adler's inferior organ is the structural pattern. This backgrounds a general feeling of inferiority which is expressed at higher psychic levels by anxiety

³⁰ I speak of psychic structures and organs just as I speak of somatic structures and organs. This use I believe fully warranted by modern theories of energy and of the structure of matter. I think, too, that to think of an idea or a feeling as an organ as only vaguely perhaps analogous to a muscle or a ganglion in having a function to perform, in being constructed, so to speak, for the special purpose of doing a particular thing, to think of the unconscious as a vast and complex organ of the mind, like the cerebrum perhaps, helps one to think of the organism as a whole and of the play of energy throughout its many structural parts.

³¹ For the function of the symbol see my *Mechanisms of Character Formation*. The Macmillan Co., New York, 1920.

in the sense of Rank. In the organic zone there is a resulting direction of energy toward the inferior organ to make up for a deficient investiture, and so long as this organ can bear the load the balance is restored. Similarly anxiety at the psychic level prompts certain readjustments that restore the affect balance.³² Now *the affect is the bridge between the mental and the physical*, and the vegetative nervous system is the neurological machinery which, with the aid of the endocrine glands, translates the affect into appropriate physiological reactions. This, briefly, is the mechanism for readjustment, for a redistribution of the energy load.

Therapeutically, therefore, it can be seen that the whole organism must be taken into consideration, not only modifiability and readjustment in the abstract, but ability of the organs involved—psychic as well as somatic—to bear additional loads. Here the long experience of the internist with functional tests, rest, recreation, etc., should not be ignored but should be fitted into the scheme.³³

The whole problem of chronic disease, it would seem, might be illuminated from this standpoint. Here we may easily be dealing with mechanisms that put too much load upon certain organs. A shifting of the objectives of the individual in time might redistribute the load so that it would be much more comfortably borne, or actually diminish it materially. Take, for example, the problem of cancer, which for so long has resisted solution. Malignant neoplasms can be thought of as examples of groups of cells which either have accumulated sufficient energy to start an independent organization of their own or have escaped the dominance of the parent organism because of its failing strength—senility.³⁴ Many illuminating analogies might be drawn along these lines, as, for example, the analogy to anarchy in the social sphere, and the embryonal character of the malignant cells as comparable to the similar embryonal character of anarchistic groups resulting as they do from a breaking down (dedifferentiation) of the social structure. It is easily to be seen that the entire symptomatology of cancer does not refer only to the tumor mass but, as in the corresponding case of anarchy, resides also in the higher centers—evidences of loss of control, loss of dominance, the result of senility.

The burden of the argument thus far has been to combat the

³² It may be that the increased investiture of the sick organ with energy (libido, interest) is an expression of an effort at healing.

³³ The internist, however, has not begun to appreciate the psychic component in his various "cures." He has too long been content to dismiss anything psychic with the designation "suggestion" which, by the way, he understands hardly at all. One mysterious word is pronounced to dismiss another mysterious word.

³⁴ See Child. Loc. cit.

tendency to consider the psyche and the soma, as relating to each other, as closed systems, or the psyche itself as a closed system. The organism as a whole, however, might well be so considered so far as the evidence goes up to this point. That the organism is not a closed system I have elsewhere³⁵ attempted to demonstrate.³⁶ In my paper on Individuality and Introversion I maintained the thesis that *the usual distinction between individual and environment is largely artificial, that the concept "individual" as implying this distinction has had a distinct history, an evolution, and that the distinction which does arise in this way is broken down by introversion as is particularly well shown in the introversion type of psychosis, dementia precox. The individual and the environment are not mutually exclusive. They are the two elements of a dynamic relation, of a constant interplay of forces, in which their relative values are in a constant state of flux.*

Childs' theory, previously referred to, assumes that, as a result of the action of the environment upon a specific protoplasm, there is set up, within this protoplasm, a dynamic, metabolic, or physiological gradient or axis. From this chief, polar, or major axis minor axes are established, *i.e.*, symmetry. Remaining within the control of this dynamic gradient is all that constitutes the individual. Individual and environment are thus easily seen to be only terms depending, at any particular moment, upon the relative strength of the forces concerned.

This general statement, however, gives little idea of the multiple ways in which these two zones of energy activity, individual and environment, interpenetrate. I will call attention here to Henderson's book on the fitness of the environment.³⁷ In this book Henderson discusses the properties of water, carbon dioxide, the ocean, and the three chemical elements, carbon, hydrogen, and oxygen. As an example of the nature of this discussion I will give the list of properties of water considered. They are: *a*, specific heat; *b*, freez-

³⁵ Individuality and Introversion. THE PSYCHOANALYTIC REVIEW, January, 1916.

³⁶ As indicating how this point of view, that the organism is not a closed system, is coming to be received in other fields of inquiry, the example of Kappers' theory of "neurobiotaxis," as one of many instances, is peculiarly pertinent. Kappers developed this theory to account for the varying positions of the medullary nuclei in different animals. According to the theory the nerve cells shift in the direction of the stimulus. See Kappers, C. U. A., Phenomena of Neurobiotaxis as Demonstrated by the Position of the Motor Nuclei of the Oblongata. JOUR. NERV. AND MENT. DIS., July, 1919.

³⁷ Henderson, L. J. The Fitness of the Environment: An Inquiry into the Biological Significance of the Properties of Matter. The Macmillan Co., New York, 1913.

ing point; *c*, latent heat of fusion; *d*, latent heat of vaporization; *e*, vapor tension; *f*, thermal conductivity; *g*, expansion before freezing; *h*, expansion in freezing; *i*, solvent power; *j*, dielectric constant; *k*, ionizing power; *l*, surface tension. He ends his chapter on water with the statement that "the following properties appear to be extraordinarily, often uniquely, suited to a mechanism which must be complex, durable, and dependent upon a constant metabolism: heat capacity, heat conductivity, expansion on cooling near the freezing point, density of ice, heat of fusion, heat of vaporization, vapor tension, freezing point, solvent power, dielectric constant and ionizing power, and surface tension." He concludes the chapter thus: "In truth, and Darwinian fitness is a perfectly reciprocal relationship. In the world of modern science a fit organism inhabits a fit environment." In fact his conclusion amounts to this: That all of the properties of matter investigated, for all practical purposes, are of maximum significance for life. His final conclusions are these:

"I. The fitness of the environment is one part of a reciprocal relationship of which the fitness of the organism is the other. This relationship is completely and perfectly reciprocal; the one fitness is not less important than the other, nor less invariably a constituent of a particular case of biological fitness; it is not less frequently evident in the characteristics of water, carbonic acid, and the compounds of carbon, hydrogen, and oxygen than is fitness from adaptation in the characteristics of the organism.

"II. The fitness of the environment results from characteristics which constitute a series of maxima—unique or nearly unique properties of water, carbonic acid, the compounds of carbon, hydrogen, and oxygen and the ocean—so numerous, so varied, so nearly complete among all things which are concerned in the problem that together they form certainly the greatest possible fitness. No other environment consisting of primary constituents made up of other known elements, or lacking water and carbonic acid, could possess a like number of fit characteristics or such highly fit characteristics, or in any manner such great fitness to promote complexity, durability, and active metabolism in the organic mechanism which we call life.

"It must not be forgotten that the possibility of such conclusions depends upon the universal character of physics and chemistry. Out of the properties of universal matter and the characteristics of universal energy has arisen mechanism, as the expression of physico-chemical activity and the instrument of physico-chemical performance. Given matter, energy, and the resulting necessity that life shall

be a mechanism, the conclusion follows that the atmosphere of solid bodies does actually provide the best of all environments for life."

The expression of Henderson's, already quoted, perhaps best formulates this whole situation, namely, "*A fit organism inhabits a fit environment.*"

We can only glimpse what this means when we begin to take into consideration the organic constituents of the environment for each individual, and for man especially, the social constituents. Among these organic constituents are the pathogenic microorganisms. If the principles thus far laid down are true, how do they come into the general scheme of things at the psychological level? I have already considered the question of whether the psyche could utilize organic mechanisms. A strictly analogous question may be asked here. Can the organism utilize the environment to the extent of selecting a specific disease? Of course one can only speculate except that there are certain suggestions that lie along the way. Was it, for example, altogether an accident (if there is such a thing) that the girl Maeder reported developed a tubercular infection rather than some other kind? Certainly we know that a particular specific infection picks out different organs in different persons. Why does one patient develop a tuberculosis of the lungs, another of the spine, another of the hip, and still another of the skin, and so on? The best explanation that grows out of the present presentation is that, in face of a more or less universally distributed pathogenic organism like the tubercle bacillus, that organ becomes involved that is, for the time being at least, at a disadvantage either as to structure, energy investiture, or both.³⁸

In bringing this all too lengthy paper to a close I suffer from no delusion that I have done anything but think on paper, with so much coherence as I could command, about an extremely difficult, abstruse, and involved subject. But I may perhaps offer in extenuation the belief that, after all, it is by the exchange of thought that thought is fed and grows.

Medicine came into its present state still clinging to many prejudices of the past. Psychiatry, as being the last branch of medical

³⁸ The whole problem of types which is so much in the air just now fails in two important particulars to envisage the problem in a way calculated to get worth-while results. In the first place it attempts to arrive at averages from material that is altogether too heterogeneous. For example, there is no reasonable excuse for lumping all precoces together on the supposition that averaging up their characters will disclose something fundamental. See my review of Charles Goring's "The English Convict" in the Jl. Amer. Inst. Crim. Law and Criminology, September, 1914. Then again the relation of the environment is not considered in the sense of this paper.

practice to find itself, has naturally suffered most. I wonder whether it may not be a modern development of the medieval idea of devils as the cause of disease which still insists that the cause must always be outside; and whether the prevailing belief that the cause must be somatic may not too be a modern development of the medieval ambivalence toward the body that identified "sin" and "the flesh."

Psychoanalysis has at least emancipated us from thinking about the origin of disease as of necessity outside the body or as somatic and of considering its presence as due to sin. With medicine in general, however, it has borne the criticism of being materialistic in its tendencies, largely, perhaps, because of its advocacy of psychic determinism.

In merging from the dark ages with their emphasis on the spiritual, science in general, and medical science in particular, was bound, by contrast if for no other reason, to be materialistic. The materialism of the last century, however, is very different from the materialism of to-day. Matter then was very simple, concrete, ponderable, tangible. To-day, with the evidences of the constitution of matter that make of the smallest particle known in the nineteenth century a veritable universe of revolving bodies separated by distances as great, relative to their various diameters, as the distances that separate the several bodies of our solar system, matter has become, if anything, more mysterious than the spirit of the Middle Ages is to us as we look back upon it. A materialism has grown up, if it is still proper to use that term, which no longer needs an idealism as counter tendency to counteract its crudities. For the scientist of to-day realizes that always there is a point beyond which his vision cannot peer but before he gets to that point the wonders and complexities of the universe as he knows them offer ample opportunities for the widest reaches of his imagination, for his creativeness and for the realization of all of his potentialities, and that it no longer is necessary to invent something beyond what we know in order to provide a sufficient stimulus to proceed. Idealism and materialism are coming nearer together, so even though they may still represent polar opposites in theory they are now capable of coming together much more nearly for the development of a practical program.

As science advances it constantly enlarges the field of the known but quite as constantly the new facts suggest new queries and the field of the unknown is contemporaneously and quite as much, if not more, enlarged. The unknown is now of such extent and of such quality that it should offer sufficient opportunity for speculation even to the mystically minded.

In offering the above I do so not with the slightest belief that I have succeeded in solving anything. There will always be a borderland between the known facts of science and the great unknown beyond that will forever prevent science from finishing its task and coming to be finally a closed system; and in this border territory, where clear formulations must give place to the uncertain, doubtful, and indistinct, science will always be vulnerable to the shafts of metaphysical trickery. I offer the above, therefore, only for such heuristic and pragmatic values as it may contain.

SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

STATED MEETING, DECEMBER 2, 1924, DR. E. G. ZABRISKIE,
PRESIDED

I. Clinical presentation:

A CASE OF MYOCLONUS, UNDIFFERENTIATED

JAMES H. HUDDLESON

Abstract.—This man, twenty-three years old, Jew, stock clerk, complains of constant twitching and jerking of the whole body, with muscular fatigue and difficulty in mental concentration. Except for a neurotic mother, his heredity is negative for three generations. His personal history is negative, except that he reached only the fifth grade in school on account of truancy; his behavior was not antisocial, and his makeup not abnormal. The present illness began gradually in April, 1920, two weeks after a fall of five or six feet, which caused a slight scalp wound. Since their onset the twitchings have become progressively more pronounced. One now sees generalized clonic spasms, about sixty to the minute, resembling those of Sydenham's chorea, but quicker; they appear anywhere, at irregular intervals, and generally involve a muscle-group or several adjacent or symmetrical groups. Among the most frequent are contractions of the abdominal walls, clenching of the fist with flexion at the wrist and elbow, and grimacing of no definite pattern. The spasms immediately increase in any part of the musculature brought under examination; still they never entirely disappear. The lower extremities are least affected. No fibrillary twitching is observed. Myotatic irritability is diminished.

The deep reflexes are markedly diminished, especially in the arms; there is hypotonia, but not in the legs. The epigastric and abdominal reflexes are slightly diminished. There are no paralyses and no atrophies. The pupils are normal at rest and in reaction, and although extraocular muscles occasionally twitch there is no nystagmus. There are no ataxias. Deep and superficial touch and temperature senses are normal. Special senses are unimpaired. A mild left hemihypalgnesia is demonstrable. There is no psychoneurosis beyond the symptoms already noted, and nothing psychotic. The mental level is in the borderline group. Mild underdevelopment and undernourishment are seen in the general physical status, which is otherwise negative. The blood, spinal fluid, and urine are normal. This case is now believed to be one of generalized degenerative tic,

although paramyoclonus multiplex remains a possibility. It has resisted all forms of psycho-, chemo-, and physiotherapy.

Discussion. Dr. G. A. Lawrence asked if any metabolism studies had been made.

Dr. L. P. Clark: I would like to ask Dr. Huddleson if he has given any particular medications in this case. If large doses of chloral are given to such patients, and they can stand from 25 to 40 grains, by gradually increasing the dose one may be able to eliminate the most disturbing myoclonic movements and thus be able to make any sort of physical examination that is desired. In my several studies upon the association disease, myoclonus epilepsy, I so modified the myoclonic movements as to gradually eliminate the different kinds of muscular movements and thus was able to determine which muscular systems were most involved by those movements being last repressed. Lundborg and Hunt have shown that probably the whole myoclonic mechanism is in greater part due to degenerations of the midbrain. However, there are a number of other neuromuscular mechanisms that are probably not specifically degenerative in character to be discovered in other parts of the central nervous system other than those of midbrain lesions. The lesions for these other atypical myoclonic syndromes are probably due to degenerative conditions in the cortex. Though one accept the mid-brain lesion for much of the myoclonic syndrome, it is still greatly modifiable, as one finds in other conditions, by psychic states. For instance, they are greatly affected by heat, cold, excitement, depression and various emotional factors which when thrown in upon this neuromuscular mechanism might distort the whole pattern, though the central midbrain degenerative lesion be organically continued. I would like to ask Dr. Huddleson how long the myoclonus has existed in this case?

Dr. Huddleson: Four and a half years.

Dr. Clark: Have there been any seasonal variations?

Dr. Huddleson: No, not that I know of.

Dr. Clark: Independent of special medication many sufferers from the myoclonic syndrome may pass months without myoclonic movements. One of my cases was relieved for eight or nine months at a time without medication and at another time we had the greatest difficulty to decrease the movements by the continual building up of sedatives; yet with proper attitudes of living he was quite free from his myoclonus, although he had suffered from marked locomotive affect; he would fall like a log whenever large masses of proximal muscles were involved which threw him suddenly to the ground. I would like to ask whether this patient had good and bad days, in which the piling up of muscle movements got so intense that he had to stay in bed? In two of my cases studied by Dr. Prout we came to the conclusion that the myoclonus was definitely a cortical disease. Later on our individual findings have been disproven by other contributions to this subject.

Dr. I. Abrahamson: As Dr. Clark has stressed, in all these cases the diagnosis rests between paramyoclonus and a generalized

tic. The so-called functional element is very conspicuous in this case, but these mutations are common to all forms of myoclonus. I am reminded of a case at the Montefiore Home, a sailor who had a very marked form of paramyoclonus multiplex; he had spasms of the platysma, the muscles of the neck and upper extremities. This man, whose muscles were constantly in motion, shaved himself with an old fashioned razor, and he made all sorts of things, such as knotted cord work; he would wait for a pause in the movements and pass the razor across his face, then wait for another pause; he kept this up until he had finished shaving without the loss of a single drop of blood. It was a remarkable sight to behold; one would almost think there is a large amount of malingering present. There is some tendency to symmetry in the movements; that is, first one arm and then the other will perform the movement; all forms of cutaneous irritations increase the number and amplitude of the movements. Observation also exaggerates them, but they also go on just the same when he is not watched. Some of these have been described as electrical. I think this case is no doubt one of real paramyoclonus multiplex and not a generalized tic nor any other form of functional disease.

Dr. Joshua Rosett: I have been recently interested in myoclonus as one of the effects of voluntary hyperpnea. A number of patients who had exhibited this phenomenon during voluntary deep breathing were subsequently operated on and were found to have extramedullary disease, that is, disease within the vertebral canal impinging upon the spinal cord. Other patients in whom myoclonus did not appear during the test of voluntary hyperpnea were operated on and in these no disease was found on the outside of the cord. The myoclonus which appears in certain patients during deep breathing is, however, of a different character from the myoclonus exhibited by Dr. Huddleson's patient. In the former a number of muscles are convulsed in such a manner that the contraction and relaxation of each muscle is entirely out of time with respect to similar contractions and relaxations of its synergists and antagonists. The result is that no movement takes place at the joints. In Dr. Huddleson's case of myoclonus multiplex entire groups of synergists contract simultaneously with the relaxation of antagonists. The result is that the patient jerks the head or the limbs.

I cannot see the reason for attributing the increased twitching of this patient, when he was brought into this room, to a superimposed hysteria. Concentration of attention is always accompanied by a fixed posture. The latter is accomplished by immobilizing the joints by means of an equal contraction of antagonistic muscles. The act of concentration of attention is therefore accompanied by an increased release of muscle tonus. This patient's attention became concentrated upon the audience when he was brought into this room, and the normal increased release of muscle tonus was utilized in him for the production of increased movements. That such was really the case may be easily ascertained by concentrating the attention of a person affected with muscular rigidity on the one hand and

of one affected with an abnormal movement on the other. The first patient will then become more rigid, while movements of the second will become increased.

Dr. S. Rothenberg (By invitation):

A woman suffering from tic movements simulating those shown in this patient, came to me some five years ago for analysis and relaxation treatments. Neither form of treatment did her any good. Finally she took up Christian Science, and that too seemed not to have helped her in controlling these violent movements of her head and body. On four different occasions, these movements caused subluxations of her shoulder joints, which required anesthesia for replacement. The diagnosis of myoclonus multiplex was made by competent neurologists of both Philadelphia and New York. Despite this severe and persistent affliction, she was determined to control her tic movements so that she was enabled to join with another girl a theatrical team. They soon were accepted on the main circuit known as the Orpheum circuit, where I myself saw them perform. During the entire time of their singing and dancing my patient showed no sign of her tic. Though she is unable to control her condition at any other time, she has never twitched while on the stage. One certainly must take the diagnosis of myoclonus multiplex with many reservations.

Dr. S. E. Jelliffe: I think Dr. Clark has said everything that was in my mind, but Dr. Rosett started another thought, and so I have been asking myself, watching these movements, what are they trying to do? Dr. Rosett has partly suggested what they are trying to do; it may be they are trying to overcome some localized alkalosis. Are these movements from that point of view to be considered as efficient? The muscular masses in human beings physiologically considered are extremely complicated. It is known that polyphasic wavelike neuronic stimuli are constantly playing in varying functional patterns, which are immersed, so to speak, in the grosser muscular structures. It is not inconceivable to see these muscular contractions as serving to show that localized functional activity is impaired, and it may be through alkalosis of functional units.

Dr. Walter M. Kraus: I have had occasion to see one case which at first seemed to be paramyoclonus multiplex. He was sent to me at the base hospital with this diagnosis. Electrical examination showed no responses typical of the disease. I finally discovered that if I told him not to move his leg, he would cease doing so. After having examined him three times, his twitching stopped and I sent him on with a diagnosis of neurosis. The case was obviously purely functional. Last year in Paris I saw a case showing motility disorder which was diagnosed Unverricht's myoclonus epilepsy. The case did not show continuous myoclonic movement. The patient could be made to have an attack by any form of moderately active sensory stimulus. He would then have severe myoclonic seizures lasting for a minute or so. I believe that the case which Dr. Huddleson has reported belongs in the group with Unverricht's myoclonus epilepsy. I noticed his movements in the hall and they were by

no means as active or as extensive as they are now. It is quite apparent that the emotional excitement of being presented has exaggerated the movements.

Dr. Huddleson (closing): In regard to the medications in this case, he has been given some chloral and bromide, but not in the large doses Dr. Clark suggested. He has also taken hyoscine and other sedatives, but nothing that did him a great deal of good. He had a great deal of physiotherapy and hydrotherapy. He gained a little temporary benefit, but nothing seemed to give him any permanent relief. The question of his having had encephalitis has come up. There is no history of encephalitis, and he had been under observation four weeks previous to the onset. He had been in the army two or three weeks before he had this fall and then another week or two before the symptoms began. We have not a good history dating back a year or so. So far as we know the man has not had seasonal remissions. As the patient has been observed, there is very little fibrillary twitching but more massive contraction, not only of one muscle, but a group of muscles, and there is general movement of the limbs; I think that is one of the reasons why a diagnosis of paramyoclonus multiplex was not made by most observers. Of course what Dr. Abrahamson said about the symmetrical movements not being simultaneous in time is correct; the movements are very much the same, but one will begin before the other, and that is quite true in this case. He does not show any nystagmus. Just as I have not known of seasonal remissions I do not know of any remissions under any treatment. As Dr. Kraus said, the movements were very much less while he was standing in the hall than when he was under the observation of several people. They are much worse under observation and vary under all sorts of conditions; but the point I wanted to make was that they never entirely cease and he has something of the kind even during sleep.

II. OLD AGE FACTOR IN PSYCHOANALYTIC THERAPY

SMITH ELY JELLIFFE

Abstract of Paper.—Dr. Jelliffe prepared this paper, he explained, more for general practitioners than for specialists. The subject was wide. Primarily, what is old age? Some individuals are born old; many an old man is still youthful. The chronological age is not an index of the physiological age, and still further physiological senescence is not an absolute criterion for psychological regression. Thus the literati tell us that Conrad began his career at fifty, and tradition still tongues the anecdote that Gladstone started to learn Greek some ten years older. Whom the “gods love” may “still die young” and Mozart, Keats, Shelley and other names spring to the fore as illustrative of the early burning out of some men of genius, yet on the other hand many a chronological dotard has offered to the world surpassing spiritual gifts of enduring social value.

The most orthodox old saw runs that “man is as old as his arteries,” and the name of Osler has been widely traduced as saying

that "sixty" is the proper chronological stadium for chloroforming. Taken all in all, whereas these generalized formulations have statistics on their side, upon a larger review one cannot refrain from the counter attack, apropos of mathematical absolutes, that the three advancing categories, "Lies, damn lies, and statistics," more correctly states the actual truth when the individual himself comes for review.

Advancing age brings with it its inevitable decline. This is the law of life that advances to death, from which no living organism, from Amoeba to Homo, can escape. *Bios*, the old Greek word, meant both Life and Death: in which we see repeated throughout the evolutionary scheme of things attraction and repulsion in physics, positive and negative in chemistry, pain and pleasure in sensation, sickness and health in medicine, good and bad in ethics, and Comedy and Tragedy to the universal onlooker, call "It" by any name one will: "God," "Fate," or "Das Es."

Psychology in its largest vision offers some interpretative formulæ as to how human beings behave in view of this inevitableness, and this is the theme into which the present paper enters in but a fragmentary way.

Case 1.—Sixty-two-year-old boiler maker, competent up to two years before accident. Has regressed to level of a night watchman on the river front in employ of a large corporation. One night he stumbles and falls upon an incoming vessel and sustains a trifling injury, somatically speaking. Shortly thereafter he is discharged since evidence is incontrovertible he is not up to his job. Psychologically however his reaction is that he has been given a "dirty deal," and since the natural cupidity of his surrounding media, wife, sons, etc., support him, a medico-legal proceeding is inaugurated to show that the injury sustained—trifling abrasions of the body—to be the cause of his incompetency. He himself reacts by an excessive exploitation of the injustice dealt to him in his discharge. He dissolves in tears, emotionally overwhelmed by the cruelty of the corporation, and has for months sat in his chair at home, a typical picture of an "arteriosclerotic dement with compensatory paranoid ideas." As a matter of fact the injury sustained is not a competent producing cause (medico-legal requirement phrasing) of the clinical picture presented, yet this is one of the types of situation upon which the "expert," presumably myself, is called upon to decide and adjust the relative merits of the situation.

Case 2.—A young woman makes a complaint to a policeman in the Grand Central Station that an old man of seventy, sitting by her side, with outspread encompassing newspaper as a shield, nudges her, and as she turns in response she sees his penis revealed, erect or semi declining. The old man is arrested and his case calls for an "expert opinion."

Here the problem falls within a different category. "*Pathological*

Exhibitionism” is the nosological group into which the case falls. It is immaterial here to give the statistics of this type of abnormal behavior which must be dealt with by the district attorney in New York or other large city. We are, for the moment, only interested in the psychoanalytic interpretation of this type of behavior.

In the study of the present instance we have an old offender and sociologically speaking, Bellevue and the Manhattan State Hospital, more or less adequately deal with him; but for our present discussion, the obvious outstanding delict is but an exaggerated example of a vast medley of similar situations varying from the palace to the hovel, to which the “innocent female” is exposed.

How does the psychoanalyst deal with these situations, first as an agent of society, and secondly as an interpreter of the instinctive impulses of the individual? In the rôle of an agent of society he must condemn the sick individual, not to Sing Sing, but to the Manhattan State Hospital; but secondly he is scientifically (sociologically conserving) curious as to the specific causes of the individual's behavior. From this aspect he may find many meliorating circumstances, in so far as he may discover—and indeed did unearth, compulsive factors, dating from early childhood, which forced him to the conclusion that this type of conduct was not wittingly vicious, but unconsciously compelling. This enabled him to say the patient's behavior was psychotic and sick and not “criminal”—as per the “legal definition.”

In the earlier years of the development of psychoanalysis, the neuroses and psychoneuroses were thought to be the special fields for the applicability of the generalizations with which Freud had made us familiar, but as time went on it developed that a general philosophy of life and its interpretations lay behind the principles so conscientiously worked out by Freud. The “*Unconscious*,” long time ago felt as a force underlying instinctive behavior, now came under the scalpel of specific dissection and it soon became evident that the human being really was worthy of the Nobel Prize for his superior gift of “passing the buck” to himself.

Psychopathology gives the general term “Rationalization” to this process and it distinguishes a great variety of grades in it. Some of it is undoubtedly physiological—for certainly if one did not have a swift cocksure answer to things, but had to inquire into the underlying “isness of the is” he could not function. Much of the stuff fed us from the cradle to the grave as education, knowledge, logic, is a crazy patchwork of these fictions, but inasmuch as they constitute the particular gilded small coin of the masses it passes muster and is serviceable in the turmoil of life temporally. When pathological rationalizations commence to influence behavior in a manner inimical to the patient's own comfort or that of his surroundings, then the problem arises how to get at these inner factors and relieve them.

Freud's and Abraham's contributions are quoted but the literature is scanty.

Case 3.—The patient, seventy-two years of age, had a partial motor aphasia and slight hemiplegia which had evidently been occasioned by a cerebral softening. The usual advice, etc., was given and after the acute situation had gone by some few months his physician sent him to me to be looked over. He still had a residual difficulty in finding his words, his hemiplegia had cleared up save for slight weakness. But he was anxious to know how to live, he had had a slightly similar attack a few years previously and he partly shared the superstition of "three out all out." And so I talked with him from the psychoanalytic point of view. It soon was learned that during the past four or five years he had been getting increasingly violently angry, was more and more irritable and often these explosions left him all in, and the "chronic chip on the shoulder" that he carried everywhere with him got no relief from golf, or motoring, or business, or anything. He was still an active, forceful personality and we had to overhaul the whole works—which we did. He was securely well to do, hence the "self-preservation" aspects of his instinctive life were not deeply involved—but it soon developed how he was handling in an imperfect manner a declining ability to have intercourse from nonerection, although harassed by augmenting eroticism. This is a frequent situation in older men, and when made widowers in the sixties the various clinical pictures resulting are distressing for the patient and very baffling for the physician.

In the present instance we had increasing irritability, increased blood pressure, violent outbursts, psychical, and a couple of blowouts, arterial.

That which was playing on the eroticism was an old daughter-complex component. Her relations with the father were very cordial and pleasant, but she was not as wise as she might have been in periodically permitting him to get a glimpse of a difficult marital situation with herself. Every time this was brought up, he was extremely kind and helpful—gave her advice, comfort and even money—but it soon became evident that he repressed a hatred to the "son-in-law" and "wanted" the daughter, and the response was an attack of temper—displaced over to the wife, and an increase in the eroticism which by reason of the outburst upon the wife found no way of satisfying itself—hence an increasing sense of frustration.

This is but a short thumbnail outline of a complex situation to which the old man caught on and soon established a better rapport with the wife, regained satisfactory relations; had it out with the son-in-law and got a good adjustment there; this helped the son-in-law over a hard bump which he had not wanted to tell his wife. This eased up her friction somewhat and a much better working combination was established. He is now eighty and busy still and has had no further blowouts to date.

Case 4 related to an old phobic condition in a woman fifty-five years old when first seen. She had had a psychoneurosis all her

life and for seven years past was mildly psychotic. Conversion symptoms of swelling, heat, turgidity of the vagina were distressing, and a persistent belief that her nose was growing larger and was the center of all eyes had been very much in evidence. The analysis cleared up the conversion symptoms within a few months, and after two years of treatment, carried on irregularly, she made an excellent recovery now of some eight years permanency.

Case 5.—A brakeman on the Portland Oregon Railroad came into my office, why I never learned. He was fifty-six years of age. In very direct simple language he told me that for about ten years every month he had had a recurrent attack of intense depression which lasted for three or four days. During this time he attended to his work with the greatest difficulty, invariably thought of suicide and had a host of guilty feelings. These guilty feelings chiefly centered themselves upon three situations—his relations with prostitute or degraded women—adolescent and manhood masturbation—and boyhood bestiality. Careful anamnesis revealed that the periods of depression began approximately a month after his mother's death. He was single; she had been a widow for a number of years, and he had supported and lived with her some years after the father's death, due to a railroad accident. Still further anamnesis revealed that the attacks came on every twenty-eight days and lasted three or four days only, and careful inquiry and but a few fragments of unconscious material—dreams—showed that he was reliving, as a substitute for his mother attachment *her* menstrual epochs, which lasted three-four days and in her had been characterized by periods of intense depression. This mother identification: the Oedipus situation, the time period, and the unconscious situation being carefully gone into, the patient left me. Two years later I received a letter from him saying that he thought he understood the whole business. He had not had another period of depression and was perfectly well. Whether it is all true or not I am not in a position to say. I present it as a cameo for the inspection of anyone interested.

The paper then went on to discuss the failures, which were as numerous as the successes, but the final conviction of an optimistic attitude, since even the failures in therapy showed their reasonableness, and that the neurotic or psychotic adjustment reached by the patient was for him a better compromise than could be offered by "reality." Reality was too hard. In O'Neill's latest expression, "God Is Hard."

Discussion. Dr. L. P. Clark: Mr. Chairman, as usual I am delighted with Dr. Jelliffe's lucid and interesting presentation of a psychoanalytic subject. I am particularly interested in his very sane and clear demarcation of the flexibility of the application of psychoanalysis to every-day problems whatever they may be, whether in youth or in age, and especially when it reaches up into the fixed

patterns of behavior in the aged. My own experience, at first under the tutelage of Freud, led me to think that we must be chary of handling cases of advanced years, but my general experience has been comparable to that of Dr. Jelliffe's, that we must not pay attention to the chronological age, but to the adaptability of the psychic organ in all its relationships to environment, and if we keep our minds open to the data presented to us we can accomplish a great deal. As Dr. Jelliffe says, pessimism certainly closes the door to any therapeutic approach. An effort has been made in English speaking countries to reduce psychoanalysis to principles of scientific mechanisms, to follow up biological trends and bring them into accord with structural and static patterns. I have been guilty with others in attempting to see where we could link up various forms of psychoneurotic syndromes with biologic concepts, thus striving for a certain degree of relationship between physiological behavior and psychic and emotional adaptations. I am persuaded that we have two sharp divisions of psychoanalytic effort: The one is to swing back toward a scientific neuromechanism in which certain phases of the dreams are the basic concepts to work upon, and the other is to swing clear of psychoanalysis as a science, and drive into the conception of it as an art, which will take precedence over natural science and is related to the impulse or instinctive psychology. In the growing use of psychoanalysis in the living conditions with which we may have to deal, it is getting to be more and more definitely the first line of attack. It will therefore lose some of the scientific formulations of biologic science, but will be nearer to the living art to which psychoanalysis must devote increasing attention. I am more and more persuaded that the crux of psychoanalysis will be away from a purely mechanical and biological concept, and more toward psychoanalysis as an art which is closely related to living social reactions. To some it may be a questionable procedure in methodology to discuss psychoanalysis as an art versus its science. One hears it urged that until the practice is better established it is better to let it rest upon the so-called firmer foundation of mechanical principles. Can psychoanalysis ever, any more than any of the arts, gain a direct aid from science? Are the two mutually colligated or supportive? We find that all the arts in some indirect and mysterious way are aided by scientific formulations—but not directly. Assuredly psychoanalysis as an art is not dissimilar in its general rules of growth, than those underlying other arts. A science which is based upon objective and provable data often stands in the way of the subject mood and its operation. The cry of the artist is heard over and over again, that science is built upon entirely different strata of facts; that it invariably stunts the progress of art wherever the former deals with purely logical processes and the latter is basically subjective and intuitive. No one can doubt that psychoanalysis purely as a science will be less and less requisitioned in the future consideration of living problems.

Second paper :

(a) THE CONFIRMED STAMMERER AND HIS DEFECTIVE ADAPTATIONS IN THE NURSING PERIOD

(b) AN INTERPRETATION OF THE MONA LISA SMILE

L. PIERCE CLARK



Abstract.—(a) Nothing less than a union of biologic, hereditary and individualistic factors can make clear the puzzling etiology of the psychoneuroses of which confirmed stammering must be considered an integral part. No amount of rationalization of the provocative causes gives us any clue to the multitudinous types of speech cramps which are encountered almost at the outset of the confirmed stammerer's career. Within a few weeks a deficiency in almost all the functions of the oral organs is present. A behavior mechanism of the whole individual organism is involved, and the speech process trips over a previously laid down behavior pattern seemingly arranged for quite other purposes. What early behaviors engross the infant which combine the oral organs and the pharyngeal and respiratory functions? None other than the simplest and earliest functions of nursing. One has but to observe any stammerer and the unfortunate use to which he puts these organs in speaking, to detect all the blurred functions of the act of nursing in operation. I have analyzed several confirmed stammerers, and in two cases I was able to verify from actual repressed data the intensive fixation upon the act of nursing and the successive alterations in the process of adaptation to adult speech. Imperfect recovery of infantile memories renders the prognosis poor, as only a complete abreaction paves the way to an emotional healing. Even though the infantile fixation upon the breast is fully laid bare, the release of the speech defect is necessarily slow as the perversion of the speech mechanism is very deeply ingrained into the most fundamental functions of the whole organism.

(b) The general explanation of the manner in which da Vinci conceived the smile of Mona Lisa which he has portrayed in several of his paintings, is fairly well stated by Pater, that when Leonardo succeeded in reproducing in the face of Mona Lisa the double sense comprised in this smile, namely, the promise of unlimited tenderness and sinister threat, he remained true even in this to the content of his earliest reminiscence. The memory of Leonardo referred to, is given by Freud as follows: "It occurs to my mind as a very early memory, when I was still in the cradle, a vulture came down to me; he opened my mouth with his tail and struck me a few times with his tail against my lips." That a person could retain a memory of the nursing period is not impossible, but Freud believes this to be in reality a phantasy which Leonardo formed later and transferred into his childhood. This has remained a fairly reasonable explanation up to the present, but in two cases under analysis it was possible for me to bring into the conscious mind of the patient the

actual reproduction of the nursing experience and a recollection of the mother's facial expression during the act.

In the first place, Leonardo was the natural child of Ser Piero da Vinci and was brought up by him. Up to a certain age we find a general flexibility of emotion in the artist's career, but later, after visiting his own mother, definite impressions seem to have been kindled within him as a result of this visit. It stirred in him an artistic attitude that continually showed in his painting the particular type of facial expression which we find in the Mona Lisa. According to Freud, Leonardo's homosexual constitution was conditioned by an intense infantile fixation on his mother, which in turn was fostered by the passionate devotion that a woman deserted by her lover would naturally lavish upon a son. I am suggesting, further, that the famous Leonardesque smile is a subconscious reproduction of the look of complete erotic satisfaction which a woman experiences while nursing her child, and which Leonardo was able to portray through his unconscious memories of his own infancy.

Discussion. Dr. Kimball Young (by invitation): While I have made little study of stammering, a case came recently to my notice which brought interesting sidelights on Dr. Clark's thesis. A student in a university nearby had suffered from stammering from the time he was four or five. I discovered in the first place that the movements of his mouth when he stumbled over syllables had very much of the nursing movements, and it struck me that it would be worth while to have moving pictures of this type of movement. He had a series of conflicts of a serious compulsive type. He had experienced a certain recurrent dream; in this dream which came as he said any time he had a conflict of any sort, he was forced to swallow something, brown in color, about as large as the end of the index finger. This object would become larger and larger, as big as a room, then as big as a house, as big as the universe, until it became a terrible task to chew it and swallow it. I think this dream is clearly related to the peculiarity of the man's stammering. It is no speech defect in an organic sense. It isn't a question of the organic location; it is purely functional. I was struck in this case first in the likeness to nursing movements and these peculiar dreams which seemed to be associated with his mouth and might be interpretive of the nursing experience. We should have an extended study of the conflicts and compulsions of the functional stammerer. Analysis and such objective records as motion pictures would be quite worth while.

Dr. B. Rosenbluth: I have made quite an investigation of stammerers, and especially stammering in very young children, three to four years of age. Usually the stammering was associated, practically in all the cases tabulated, with masturbation. The child would masturbate and fall over and relax. Then the mother would come to see what was the matter, and the child would stammer. That happened several times a day until in time the mother would be unable to trace the masturbation. When these children were corrected from the standpoint of masturbation they were cured, and others that were allowed to go on longer kept on stammering. This, of

course, was hardly noticed until the child began to go to school. There the constant watching of the teacher as compared to the mother made the child continually stammer as a state of defense. Stammerers never stammer when they are alone; only one out of several hundred stammers when alone. I haven't looked upon it from the angle of the nursing period or that particular hypothesis. As to erotic pleasure which the mother experiences in nursing, I have one case, a girl of eighteen, who took all the babies in the tenement house to her dry breast and derived sexual pleasure.

Dr. M. C. Rose (by invitation): I have made a study of stammering for some years. Such exercises should be practiced as "Round the rugged rock a ragged rascal ran," and when in the presence of a stranger they will soon get over the habit of stammering. So many people gasp for breath two or three times when they start to make a speech and have to start in again. If they are brought out and taught good strong games to develop their strength as Roosevelt did, and learn a little public speaking, the stammering defect can be overcome.

Dr. Jelliffe: Dr. Clark gave a paper a few years ago on stammering, and I repeat some of the things I said then. I firmly believe that Dr. Clark is not quite careful enough in his definition, because I think he will recognize that there are stammerers at different levels, not all are at the breast level by any manner of means, and as stated there are stammerers whose speech defects are determined by other genital organizations than the pregenital organization involved in the oral erotic phase. Thus there are easily cured stammerers and others who resist the efforts of everybody. Undoubtedly there are many variations in the patients, but I think there is one thing quite certain, that Dr. Clark is not quite correct when he speaks of the oral-erotic phase as incorporating other displaced patterns. Some of you may remember that I thought it was quite valid to view the m-m-m-m types of stammerer as showing oral-erotic fixations, whereas the ss-s-s-s type was evidently showing a displacement from urinary erotic factors; whereas the b-b-b-b stammerer, especially those who burst out, show a displacement to the analerotic pregenital organization fixation. These displaced patterns as entering into the nosology and etiology of the stammerer are entitled to a little more emphasis than Dr. Clark has placed upon them. The scientific investigation of these stammerers is a terribly laborious task; next to a deaf person I think they are the hardest persons to analyze.

The question of "Round the rugged rockness" suggested by another speaker is perfectly valid, but it is a more or less conscious formula. Whereas the sense of guilt—for there is a sense of guilt when they stand on one foot and slink behind—we know perfectly well can be run back along the Oedipus formula in one shape or another. I feel that not enough attention has been given to the respiratory pregenital erotic pattern. Stärcke has recognized this and has dealt with it as the "apnoeic" phase, which possibly antedates in some respects the oral-erotic pattern. The child wants to "holler"

and at the same time "swallow," and it is a 50-50 proposition. Everybody knows that even in advanced years we may hold our breath when we want a good defecation and everybody knows that this b-b-b-b has to be suppressed when it comes to the divine afflatus that goes down instead of up.

One word to say about Leonardo da Vinci: I think Dr. Clark is quite right in some respects. I know at least 20 to 30 clean-cut histories in which the nursing erotic experience is very vivid, and I have known women who have told me they experienced orgasms during nursing which were far more vivid than those derived from sexual relation with the husband.

Dr. Clark (closing): I have taken occasion at least three times to make communications on stammering, and after seven years devoted to the subject I quite agree with Dr. Jelliffe that they are extraordinarily difficult to handle. I have studied both conscious and unconscious data and my thesis deals essentially with the confirmed stammerer, and not the other types which develop in later life and are allied to collateral diseases. I think the essential stammerer, like the other phases of ego-erotic neuroses, will be difficult to analyze even if we know the mechanism by which it evolves, because it belongs to the homosexual constitution and therefore it is going to be extremely difficult to apply analytic procedure.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MEETING—NOVEMBER 20, 1924, C. MACFIE CAMPBELL,
M.D., PRESIDENT IN THE CHAIR

REPORT OF AN UNUSUAL CASE OF EPIDEMIC ENCEPHALITIS

DR. HARVEY B. SANBORN

The patient, a married woman thirty-six years old, whose family history was irrelevant and whose personal past history was negative except that she had been a high liver and perhaps overindulged somewhat in alcoholic beverages, was operated on November 26, 1923, for a left mastoiditis, and for a few days before and following the operation showed a paralysis of the external rectus muscle on the side of the mastoid. By January 1st the ear and the mastoid wound were well healed, and she seemed to be making a good recovery. On January 11, or about seven weeks after the mastoid operation, the patient again became acutely ill with fever, intense headache, an herpetic eruption on the right side of the face and severe pain at the site of the eruption. I first saw her on January 15th. She had a fever of 100 to 101; showed an herpetic eruption on the right side of the face; was suffering severe headache and pain at the site of the eruption; showed a suggestion of paralysis of the right upper lid and some dilatation of the right pupil; and

both knee jerks were diminished. The only diagnosis made on this date was: Herpes Zoster following a mastoid infection. On January 23d she showed a complete right ophthalmoplegia without other evidence of cranial nerve involvement, and a complete loss of knee jerks and Achilles jerks. Fever persisted. Spinal fluid examination showed a cell count of 23; all lymphocytes and increased globulin. The Wassermann on blood and spinal fluid were negative. Eye grounds were negative. There had been no lethargy. Patient was depressed and very irritable. A diagnosis of probable epidemic encephalitis was made and later concurred in by Drs. E. W. Taylor and Channing Frothingham, although we all felt some doubt.

The fever persisted intermittently for about four weeks; the headache and facial pain gradually left and after several weeks the power in the eye muscles began to return. The knee jerks returned after an absence of about two weeks. Some time in May, or about the time she began to get out and about and again partake of alcoholic drinks, she began to have an excessive thirst and polyuria, and this has persisted. The findings in October by Dr. Frothingham were typically those of a diabetes insipidus and the symptoms are now being held in check by intramuscular injections of pituitrin twice daily. There is still slight weakness of the extraocular muscles and the pupil remains widely dilated.

The case is of interest because of the onset with herpes, the prolonged intermittent fever, the complete ophthalmoplegia of one eye without other cranial nerve involvement, and the sequence of a diabetes insipidus syndrome.

Discussion: DR. E. W. TAYLOR: Dr. Sanborn has covered the symptomatic ground very completely. As he has implied, the diagnosis was one of extreme difficulty, and I do not yet feel altogether sure that encephalitis is the correct diagnosis, but in the absence of any other, by exclusion, that is the safest. The herpes and the presence of a previous definite infection of the mastoid complicated the situation very materially, as did also the very definite alcoholic history. She was very irritable, and her temper was of the most extraordinary sort. Whether or not that is her habitual manner, I do not know. I presume the diagnosis of encephalitis is the most probable one, but there was scarcely a feature of it which seemed to me in any sense characteristic. Complete unilateral ophthalmoplegia must be exceedingly rare. I am very glad Dr. Sanborn has reported this case because it is increasingly important that we should recognize the unusual types of encephalitis.

DR. CHANNING FROTHINGHAM: The case presents several points of considerable interest. The first point which came to my mind was "Did this patient ever have an acute otitis media and did she ever have a mastoid infection?" I do not feel sure that she ever had either, and I think it is perfectly conceivable that the symptoms of acute middle ear and the mastoid may have been part of the encephalitis. If we could rule out the acute middle ear and mastoid, would that make a diagnosis of encephalitis any easier? The trouble in the first place was in the left ear, then the left mastoid region,

and finally swung over to the right side of the face. The next question is what is the end result? Has the patient at the present time diabetes insipidus resulting from the encephalitis, or is she just slowly recovering from the paralysis, the prostration, diarrhea and fever? Are her present symptoms the result of her habits? She insists that she developed a tremendous thirst before she began to drink alcohol again after her illness. Although she drinks alcohol, perhaps more than she ought to, it does not seem to me that she drinks enough to account for diabetes insipidus. I had the opportunity to observe her in an environment where she was on a fixed level of life with just a little alcohol, a regular routine of diet and physical exercise. On that program she drank practically ten liters of water a day and put out ten liters of urine. Then when she was given pituitrin subcutaneously on the same program she dropped to five liters and then three liters a day. After stopping the injections and giving her the pituitrin by the nasal spraying method, the amount of urine promptly went up again to at first six, and then eight liters a day. It is fair to conclude that she has a polyuria and polydipsia, markedly influenced by the administration of pituitrin, which seems like diabetes insipidus. Then the question arises did this come from or was it a result of encephalitis or has she, perhaps, some disease of the pituitary gland or central nervous system which has given her all these various symptoms in her eye and ear, and now diabetes insipidus? I should like to ask Dr. Sanborn if diabetes insipidus is a common sequel of encephalitis? Her basal metabolism is normal, her skull plate is normal, and her eye grounds are normal at the present time.

DR. MABEL ORDWAY: In 1918 Dr. Beverly Tucker discussed the involvement of the pituitary in encephalitis cases in his experience.

DR. PERCIVAL BAILEY: So far as I know no one has shown definitely that the causal lesion in diabetes insipidus lies in the hypophysis. The clinical and experimental evidence point rather to a lesion of the hypothalamus. In this patient the diabetes insipidus might well have been due to such a lesion, since the encephalitic virus is markedly neurotropic. Diabetes insipidus is not a rare sequel of epidemic encephalitis, and in all cases investigated no lesion has been found in the hypophysis.

DR. J. W. COURTNEY: Foster Kennedy has reported a very extraordinary case of diabetes insipidus following encephalitis; it must be recognized as one of its sequels.

DR. C. MACFIE CAMPBELL: A case of a young woman suffering from diabetes insipidus as a result of encephalitis has been observed at the Boston Psychopathic Hospital.

DR. SANBORN: Dr. Taylor raised the question whether the patient's irritability was habitual with her. I do not know, but after talking with the family physician I should judge it might be. It might well have been accentuated or brought about by the illness, but I think that latent irritability was there all the time. The question was asked whether this patient really had otitis media and mastoid disease or not. I have talked with the aural surgeons who had charge of

the case, and they seem to feel that the operation showed definite signs of mastoid infection. Dr. Frothingham raised the question as to whether, if this was not otitis media and mastoid which she had back in October or November, would the picture be any more typical of encephalitis? I do not know that it would. We find in a majority of the cases of encephalitis a history of preceding infection of the respiratory tract, and what the relationship between the two conditions is we are not sure. In this particular case, we might conjecture that the mastoid infection simply served to lower her resistance, or there might be a more intimate relationship. On the other hand, if we wish to theorize and say that possibly the mastoid pain and the transient external rectus paralysis were not due to actual mastoid infection, but the earliest manifestation of an epidemic encephalitis, then such a clinical picture is not out of harmony with other known cases of encephalitis in which there has been a period of remission between different manifestations of the disease. As to diabetes insipidus being a sequela of encephalitis, I was under the impression that there have been a respectable number of cases reported in which it followed encephalitis.

COMBINED VENTRICULAR AND LUMBAR PUNCTURE IN THE DIAGNOSIS OF BRAIN TUMOR

DR. FRANK FREMONT-SMITH AND DR. JOHN S. HODGSON

DR. FRANK FREMONT-SMITH: In certain patients complete neurological study is not possible, in others the result of examination may still leave in doubt the localization of an intracranial tumor. In such cases we suggest the use of combined ventricular and lumbar punctures as an aid to localization.

You will recall that in 1921 Ayer presented to this Society a method for combined lumbar and cistern puncture by which he was able to demonstrate the presence of dynamic block in the spinal subarachnoid space such as may be caused by a tumor pressing on the spinal cord. Our method is based upon Ayer's work and follows as a logical sequence to it.

The lateral ventricle is punctured in the usual way and an initial pressure reading is obtained, then enough fluid is withdrawn to lower the pressure to within normal limits. Lumbar puncture is now performed and simultaneous pressure studies are carried out in the same manner as described by Ayer (*Archives of Neurology and Psychiatry*, Jan., 1922, Vol. VII, pp. 38-50).

It will be remembered that normally there is free communication between cistern and lumbar subarachnoid spaces. A sufficient number of ventricle punctures combined with lumbar punctures or with puncture of the cisterna magna have been done by Mixter and Ayer in cases of acute meningitis, and by Solomon and others in cerebrospinal syphilis to demonstrate that the same free communication obtains normally between ventricle and lumbar subarachnoid space.

Thus with a patient in lateral position manometers attached to lumbar and ventricle needles will register equal pressures. Withdrawal of fluid at either locus will cause a simultaneous fall in each manometer.

Jugular compression will give a prompt, simultaneous and equal rise in pressure in both ventricular and lumbar manometer, and on release of jugular compression both fluid levels will promptly fall to the original level or a little higher. Pulse and respiratory oscillations will be noted in each manometer and there will normally be a slightly greater amplitude in the ventricular manometer. Any change in pressure within the fluid spaces will be registered immediately and equally in the two manometers. These are the normal relationships, wholly similar to those obtained by lumbar and cistern punctures.

Complete spinal subarachnoid block manifests itself by abnormal pressure relationships between lumbar sac and cisterna magna. Changing the pressure in one locus will fail to register by a corresponding change in the other. Of the various tests, the most important is the response to jugular compression. In complete block no rise whatever will obtain in the lumbar manometer when the jugular veins are compressed, while normal rise and fall will occur in the cisterna magna. In many early cases Ayer has demonstrated partial dynamic block. This is shown by a relatively slow and slight rise in lumbar manometer on jugular compression, with a delayed fall on jugular compression release.

A tumor or other lesion causing a block between ventricular and lumbar fluid should manifest itself in just the same way. It must be borne in mind, however, that complete obstruction to the outflow of cerebrospinal fluid from the ventricular system is compatible with life for only a short time, provided the cranial sutures are ossified. When the outflow is partially restricted the ever rising intraventricular pressure tends to keep a partial communication open. Complete block then is not to be expected and has not been our finding. Ayer made use of chemical as well as hydrodynamic differences in the two fluids and emphasized the fact that the increase in protein in the fluid below a partial spinal subarachnoid block may occur earlier than demonstrable differences in hydrodynamic relations. Protein is also increased in the fluid above a spinal subarachnoid block, but this increase is relatively slight. The increase in protein is also found below certain brain tumors and may be striking when there is little or no evidence of dynamic block. There is general agreement that normally the ventricle fluid contains a little less than half the protein found in the lumbar fluid. Cestan (Cestan, Riser and Laborde, *Rév. Neurologique*, No. 4, April, 1923, p. 353) gives 10 mgs. per 100 c.c. as a normal value in the ventricle and 30 mgs. in the lumbar. In our laboratories we have found normal ventricular protein to range between 5 and 20 mgs., while the lumbar values lie between 12 and 40. In no case have we found the ventricular protein to be greater than half the lumbar when normal relations exist. When block between lumbar and ventricle subarachnoid space is present we have

found the ventricle fluid protein normal and the lumbar fluid varying from normal to 400 mgs. per 100 c.c.

As would be expected, it is the tumors lying below the tentorium which most commonly produce dynamic block. We have had no experience with the more rare midbrain tumors or those in the region of the pineal gland.

CHART

Accompanying chart summarizes findings in 14 cases of combined puncture. Case 15 is added because of high ventricular protein. Tumor projected into lateral ventricles.

Combined Lumbar and Ventricular Puncture

		Protein	
		L.	V.
1. Cerebellar Glioma.....	Partial Block....	61	18 left 35 right
2. Cerebellar Glioma.....	Partial Block....	64	24
3. Cerebellar Arach. Cyst.....	Partial Block....	66	23
4. 4th Ventricle Tumor.....	Partial Block....	38	7
5. 4th Ventricle Tumor.....	Partial Block....	37	12
6. C-P Angle Tumor, Acoustic Neuroma	No Block.....	400	13 left 13 right
7. C-P Angle Tumor, Acoustic Neuroma, C-P Angle Tumoe	Partial Block....	267	8
8. C-P Angle Tumor, Endothe- lioma	Partial Block....	181	15
9. Parietal Arach. Cyst.....	No Block.....	44	16
10. Temporo-Frontal Arach. Cyst	No Block.....	55	342 *
11. Glioma: Left Motor Cortex..	No Block.....	27	33 *
12. Glioma: Left Frontal Lobe..	No Block.....	45	20
13. Left Frontal Tumor.....	No Block.....	40	24 *
14. Glioma: Left Motor Cortex..	No Block.....	138	103
15. Tetratoma: 3rd Ventricle....	Not Simultane- ous	200	129

In most of these cases the diagnosis was made correctly without the aid of combined puncture. In no case have the results of this procedure been contrary to the correct localization. In three cases combined puncture has been of definite aid in diagnosis.

SUMMARY

Combined ventricular and lumbar punctures in fourteen cases have given the following results:

1. Partial dynamic block in subtentorial tumors or cysts—seven out of eight cases.
2. Increased protein in lumbar fluid in subtentorial lesions—six

* Red Blood Cells in Fluid.

out of eight cases (two fourth ventricle tumors showed little if any increase).

3. Marked increase of protein in lumbar fluid in cerebello-pontine angle tumors—three cases (two acoustic neuroma, one endothelioma).

4. No dynamic block in tumors or cysts of cerebrum (intraventricular tumors excepted)—six cases.

5. Slight or no increase in protein in lumbar or ventricular fluid in cerebral tumors (intraventricular tumors excepted).

Finally we wish to make clear that this is a preliminary report on a procedure which is still in the experimental stage. We do not yet offer it as of proved value.

DR. JOHN S. HODGSON: The use of combined ventricular and lumbar puncture in the localization of brain tumor was suggested by the work of Doctor Ayer on combined cistern and lumbar puncture in the determination of spinal subarachnoid block in cases of cord tumor. Dandy, in cases of brain tumor in coma, in which none of the usual methods of localization were of value, has performed bilateral ventricular puncture. He aspirates ventricular contents, and injects indigo carmine into one ventricle, recovering the solution either from the other ventricle or at operation from the cisterna magna. He had suggested the possibility of recovering the dye from the lumbar region.

So far as we are aware, combined ventricular and lumbar puncture, and the hydrodynamic and chemical study of the two fluids as an aid in the localization of brain tumor has not hitherto been reported. We believe that this method is helpful wherever localization is impossible or doubtful by other means. This includes coma cases. The procedure enables us to obtain the lumbar fluid and with less danger of medullary injury than in lumbar puncture alone. In cases with block it is essential that only a minimum amount of lumbar fluid be withdrawn. Concerning the technique, the patient is placed on the side as for simple lumbar puncture. Local anesthesia is generally used. The ventricular needle should be of the same bore as the lumbar and has a three-way connection into which fits a manometer. The posterior horn of the vestibule is the site most commonly chosen for the tap. If both lateral ventricles are tapped, block between them can be determined. We have had no case in which this existed. Ventricular puncture precedes lumbar puncture in all cases, and the ventricular pressure is lowered to normal limits before lumbar puncture is performed in order to avoid the danger of medullary injury. Immediately following ventricular puncture lumbar puncture is done, and simultaneous manometric pressure readings are made in ventricular and lumbar regions. The rate and amplitude of pulse and respiratory oscillations in the two manometers are compared with and without jugular compression or cough. Response to jugular compression in the two loci is most important as indicating the presence or absence of dynamic block. Fluid is then removed, first from the ventricle and then from the lumbar region, the effect on the ventricu-

lar and lumbar pressure levels noted, and jugular compression is repeated. The final pressures in the ventricles and lumbar region must be left equal and normal. We have injected air into the ventricles in the majority of our cases. In the absence of block the injection may follow combined puncture. In the presence of block the injection should be done later. Cases of block have to be carefully watched following either combined puncture or pneumoventriculography for early signs of respiratory failure. Should these occur, immediate relief can be obtained by ventricular tap. In one of our early cases in which partial block was present air was injected at the end of the procedure. Twelve hours later the patient suddenly died. Necropsy showed a large cerebellar glioma with pressure cone. This is case two on the chart.

We are reporting a small series of cases, in which we have found combined ventricular and lumbar puncture a valuable adjunct in the localization of certain brain tumors. The method is not intended to replace the usual means of diagnosis. We believe that results have been sufficiently encouraging to justify its continued use.

DISCUSSION

DR. J. B. AYER: Any mechanical procedure which sheds light on a doubtful diagnosis should be welcomed. It is likely that this procedure falls into this category. The technique is logical, and if we admit that ventricular puncture is a procedure which may reasonably be employed frequently, as has been vouched for in a recent paper on meningitis, then we should not hesitate to employ this method in this important group of cases. While, of course, the results obtained in this small series should not be taken as final, it would seem as if block could be demonstrated pretty constantly in tumors below the tentorium, whereas it seems quite as certain that tumors above the tentorium do not produce block. This is exactly what one would expect, and it is perfectly reasonable that these workers have obtained such results. The analogy with the findings in cord tumor are similar but less striking. It has been suggested by a number of workers that there are characteristic findings in the lumbar fluid in cases of brain tumor. Stress has been laid in particular upon the goldsol changes, but increased protein has also been mentioned as a characteristic finding. In our laboratory these two abnormalities have been encountered, but no constant finding has been obtained. Certainly no localizing sign has been obtained by examination of the lumbar fluid in our clinic. Therefore, we welcome this new procedure as of hopeful aid. As a by-product of this work, we may call attention to the fact, insisted upon by many, that lumbar puncture in brain tumors in the cerebellar fossa is dangerous. This fact discourages us from examining the fluid where such a possibility exists, although we frequently are most anxious to know what the fluid in such a case would show. It is possible that the preliminary withdrawal of the fluid from the ventricle will allow us safely to perform lumbar puncture in these cases, although it must be admitted that even this technique is not free from possible danger.

DR. BAILEY: Doctors Putnam and Sterling have made two such observations in our clinic on two patients in which diagnosis was in doubt. We all know of many cases of brain tumor which we are entirely unable to localize, and any procedure which will aid in the localization in these cases should be given every possible consideration.

DR. W. J. MIXTER: I have watched this procedure with a great deal of interest, and from the surgical angle it seems to me it is something that gives every promise of being a distinct help. One of the greatest difficulties I have in the localization of brain tumors is the differentiation of a case that has perfectly definite signs between frontal lobe and cerebellar lesions. This has come up at various times in the past. This procedure may give us the key to the differentiation between frontal and cerebellar tumors which are otherwise not open to localization.

DR. HENRY R. VIETS: I have noticed that there have been some technical difficulties in carrying out this new procedure, perhaps because of the position in which the patient must be placed on the operating table. Is it not possible that ventricular puncture alone, without lumbar puncture, will give us all the information, in a good many of these cases, that is necessary for diagnosis?

DR. FREMONT-SMITH: Perhaps I did not make it clear that whether block existed or not, on jugular compression there was always a normal rise in the ventricular manometer. Abnormal findings were shown only in the lumbar manometer.

DR. MIXTER: I do not believe ventricular puncture alone will answer because in the first place one cannot demonstrate partial block by ventricular puncture alone. One cannot do lumbar puncture on account of danger. It is possible that air injection would answer the question in a certain number of cases. I think it is probable that it would, but there is a great possibility that this method will be safer than air injection. These are matters which remain to be worked out, but I feel that ventricular puncture alone will not answer the questions which we wish to answer by the combined puncture, in particular, the question of partial dynamic block.

SOME FURTHER CASES OF EPENDYMOMA

DR. PERCIVAL BAILEY

Dr. Percival Bailey presented the clinical histories of seven patients with brain tumor. Examination of the specimen removed at operation or at necropsy showed the tumors to be ependymomas. Three were in the fourth ventricle region, three in the cerebrum, and one in the spinal canal. In all of them the typical granules known as blepharoplasts were clearly visible in the cells. (Microphotographs were submitted to the members in support of the reader's conclusions. The article will be published in full soon.)

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY.

1. VEGETATIVE NERVOUS SYSTEM.

Neuschlosz, S. M. POTASSIUM IONS AND MUSCLE TONUS. [Klin. Woch., Jan. 1, 1923, II, No. 1.]

Neuschlosz studied the action of strychnin on toads: He suspended one gastrocnemius muscle in Ringer's solution and the other in a similar solution free from potassium. While the tetanus was the same, the preceding tonic stage was very feeble in the muscle in the potassium-free solution.

Barkman, A. MYOTONIC DYSTROPHIA. [Act. Med. Scand., 1922, LVI, No. 6.]

This is a clinical description of a case of myotonic dystrophia presenting two new symptoms. Endocrine derangement plus cerebral lesions are the suggested etiological factors. The former causes the dystrophia, the latter the myotonia.

Sivertsen, I., and Dahlstrom, A. W. RELATION OF MUSCULAR ACTIVITY TO CARCINOMA. [Jour. of Cancer Research, Oct., 1921, VI, No. 4, J. A. M. A.]

Carcinoma in men, especially retired farmers, has been noted frequently. These patients, men with large, well developed bodies of the "frontiersman" type, usually gave a history of having retired from the farm in good health, a few years previously, to enjoy a well deserved rest. On the other hand, farmers who, for one reason or another, still shouldered the responsibilities of the farm, were well and working hard through 60, 70, or even 80 years of age. This observation brought Sivertsen and Dahlstrom to consider muscular activity in relation to carcinoma. There have been no deaths from carcinoma among the Turn Teachers in the past thirty years. The Turn Teachers are of necessity active in a muscular sense. The authors assert that they have seen precancerous patients improved clinically with increased muscular activity. Attention is called to observations of less carcinoma among those of necessity physically active. The reported incidence among domesticated animals is greater than in wild animals. A working hypothesis is advanced: That human carcinoma may be the reaction to and the result of chronic irritation of adult epithelial tissue bathed in body fluids altered by certain metabolic products as a result of deficient

muscular activity. From a study of carcinoma deaths among males in Minnesota for three years it appears that the death rate in those who are active is greatly exceeded by the death rate in those who are inactive. From a study of the death rates of those who are actively engaged in a gainful occupation it appears that the death rate is lowest in those occupations involving the greatest amounts of necessary muscular activity, and is highest in those occupations involving the least amounts of muscular activity. The age incidence factor of the cases studied does not explain the variations shown.

Stiefler, G. THEORY OF PARTIAL MYOTONIA CONGENITA. [Zschr. f. d. ges. Neur. u. Psych., Vol. LXXIX.]

Stiefler shows in the literature that the cases of partial true Thomsenian disease are very rare, but those from the group of paramyotonias and myotonic dystrophies are somewhat more frequent. He describes the case of a thirteen-year-old boy with mild imbecility in whom the classic myotonic symptoms are evident in the lower extremities while the rest of the body is free from them.

Lewis, D. MYOSITIS OSSIFICANS. [Journ. Amer. Med. Assoc., May 5, 1923.]

D. Lewis has observed two cases in which bone developed in incisions of the abdominal wall. In one case a posterior gastroenterostomy had been performed for duodenal ulcer. The post-operative course was uncomplicated. The patient left the hospital thirteen days after the operation much relieved, the pain and distress following the taking of food having completely disappeared. Three weeks after the operation he noticed some tenderness in the scar, so marked that he could not wear a belt without considerable distress. Seven weeks after the operation a definite mass, measuring a fingerbreadth or more in width, could be felt along the entire length of the scar. This mass was of the consistency of bone, and the X-rays cast a definite shadow. This mass was not removed. The patient was lost sight of, and the final outcome cannot be stated; the mass was, however, decreasing in size. In the second case myositis ossificans developed in the muscles of the lower abdomen following a suprapubic prostatectomy. In four cases the myositis ossificans followed injuries about the elbow, developing most frequently after posterior dislocations. The differential diagnosis is discussed at length. In the etiology of myositis ossificans different factors play a part. No one theory will explain all cases. Myositis ossificans developing in the abdominal wall in clean incised wounds, where there is no possibility of any injury to periosteum or bone, is apparently due to the metaplasia of connective tissue, fascia and muscle in contact with acid secretions becoming converted into bone. It is striking how many cases of myositis ossificans in the abdominal wall have followed operations on the stomach, either a gastroenterostomy

or resection. Myositis ossificans developing after dislocations is apparently due to periosteal stripping and displacement. The ossifying myositis occurring in fractures associated with considerable movement of the fragments, such as the pathological fractures occurring in tabes, demonstrate better than any other lesion the part played by periosteal stripping and displacement in myositis ossificans.

Slauck, A. MYOTONIA CONGENITA AND INFANTILE PROGRESSIVE SPINAL MUSCULAR ATROPHY. [Zschr. f. Nervhvk., 1921, LXVII, 1.]

Slauck makes a report of 11 cases clinically examined by J. Hoffman and in which Slauck also could perform an autopsy with microscopic examination in two cases. He found that the myotonia congenita first described by Oppenheim in reality is a spinal muscular atrophy developing in prenatal or early postnatal life. Hoffman frequently found fibrillary tremors of the tongue, although these are rare in the other body musculature. A number of cases showed reaction of degeneration. The familial character of the disease was emphasized by five cases in which four were brothers and sisters while the mother of the fifth was a sister of the mother of the other four. The course was mostly progressive, prognosis as a rule uncertain.

Valley, Aldabalde D. R. MUSCULAR DYSTROPHY IMPROVED BY ADRENALIN.

The author reports an atypical case which he calls one of pseudo-hypertrophic muscular atrophy of the Duchenne-Griesinger sort, but with particular symptoms passing rapidly from the lower to the upper extremities. There was no hereditary or familial character and the case developed in adolescence in an individual male of twenty years, well developed mentally and physically. There had been measles at seven, malaria a number of summers and a fall at one time, but these without apparent lasting results.

The illness manifested itself June, 1919, with pain in the lumbar region on stooping and weakness first of lower than of the upper extremities. No pain in them but sensations between the shoulders. This was improved by use of the cautery, but neither the latter nor electricity nor potassium iodid internally affected the weakness. Patient even worse after other antisyphilitic treatment. Muscular development seemed normal. Movements of both shoulders were very weak, those of flexion and extension of the forearm less so, of hands and fingers normal. Those of rotation and lateral flexion of trunk weakened. Thighs could scarcely be bent, knee movements not so weak. Those of feet and toes normal. Patient crawled up on all fours from a recumbent position holding on his thighs and legs with his hands. In walking he held to two persons, separated his legs and swayed. Micturition sluggish since childhood. Alternate constipation and diarrhea.

Reflexes: No olecranal; radial and ulnar weak; abdominal doubtful;

patellar, cremasteric and Achilles normal; plantar normal, but left slightly weaker; pupillary normal.

No abnormality in sensibility, no electric reaction of degeneration, but weakness of response in affected muscles.

Treatment: Thyroid used to lessen the adipose tissue, but this did not improve the action of the muscles. Discontinued also because pulse was accelerated. Began giving adrenalin as much as a milogram twice or even three times daily. Muscles of arm improved in strength. No advantage in attempted combination of thyroid with adrenalin. Cacodylate and glycerin phosphate of sodium, nucleinate of sodium, massage, vibration, potassium iodid were tried without effect, except in the case of massage which was of less effect than adrenalin. The latter was given daily a milogram hypodermically combined with massage of lower extremities every ten days. Patient could now walk with two crutches and raise himself promptly with ease. Alternation of this treatment with periods of rest produced much gain in muscular control although exhaustion followed effort. Pains in shoulder when walking responded to massage there. Pains in hip yielded to jet of hot water in the lumbar-gluteal region followed by massage.

August 1 the galvanic current was used with the anode in the lumbar region and cathode on the buttocks. Gain in strength with some correction of constipation. After fifteen galvanic treatments patient could walk with single cane. Slight toxic symptoms followed another use of adrenalin, but soon disappeared on reduction of dose. Various periods of medication increased strength in arms. In November, 1920, faradic current was applied to the lower limbs for two weeks; gain in muscular strength. Adrenalin continued in association with massage and faradic current. Systolic pressure was never more than 130, diastolic not more than ninety. In March 1921 the arms were more easily moved although easily exhausted by work, same true of legs in lesser degree. Even in going upstairs some gain was evident. In coming down walked on toes. Could raise himself well, impossible previously. Finally walked without support, though still tottering a little. Micturition had not improved.

Van Westrienen, A. F. A. S. AMYOTONIA CONGENITA. [Nederlandsch Tijdschrift voor Geneeskunde, Jan. 20, 1923, LXVII, p. 314.]

The writer has shown to the Rotterdam Clinical Society a case of Oppenheim's amyotonia congenita in an infant of eighteen months. There has been since birth great atony of all muscles, especially those of back and neck. The arms and legs are moved, but their muscles are rather flaccid. There is extreme atonia of joints, with abnormally free movements. The face is normal and so are all the muscles innervated by the cranial nerves. The tendon jerks and periosteal reflexes are absent. Babinski's sign is present off and on; the abdominal reflexes are present. In respiration there is slight indrawing of intercostal spaces. The

electrical reactions are normal. No psychical defects. Negative Wassermann. No hereditary or familial taints in the history. In this disease we have a diminution of the number of cells of the ventral horns throughout the whole extent of the spinal cord, lack of medullary sheaths in the ventral roots, and foci of atrophy in the muscles. A precisely similar picture is seen in the progressive spinal muscular atrophy of Werdnig-Hoffmann. But those two diseases have a different clinical course: In amyotonia congenita some improvement occurs, but not in the Werdnig-Hoffmann atrophy; in the latter disease death occurs usually in the first year of life. It is also a familial disease, and there is reaction of degeneration in the muscles.

Although some writers regard these two diseases as really one disease, occurring at different periods of life (amyotonia congenita during intra-uterine life, the Werdnig-Hoffmann atrophy after birth), yet the clinical differences are so great that we must regard them as separate diseases. Yet it is true that a transverse section of the spinal cord from a case of Oppenheim's amyotonia cannot be distinguished from a case of the Werdnig atrophy. [Leonard J. Kidd, London, England.]

Lewy, F. H., Kindermann, K. HARDNESS OF MUSCLES AND TONUS. [Zschr. f. d. ges. Neur. u. Psych., Vol. LXXX, Nos. 1-4.]

The result of a test with the Wertheim-Salmonson sclerometer upon a large number of sick and healthy subjects showed that the muscles of tabetics, chronic bedridden cases and many asthenics are abnormally soft; those of hemiplegics and still more of patients with paralysis agitans are abnormally hard.

Auricchio, L. PRIMARY PROGRESSIVE MYOPATHY; FOUR CASES. [Pediatrics, 1922, XXX, p. 488.]

In Auricchio's case, the four brothers under thirteen, presented stages of the primary progressive myopathy. No benefit was apparent from vigorous thyroid or antisyphilis treatment.

Variot, G. CERVICAL MYOTONIA IN NURSINGS. [Bull. d. l. Soc. Méd. d. Hôp., Dec. 1, 1922, XLVI, No. 34.]

Four infants showed this syndrome in conjunction with craniotabes and plagiocephaly. The unilateral myotonia is the cause of plagiocephaly.

Rosett, J. THOMSEN'S DISEASE. [Brain, 1922, Vol. XLV, p. 1. J. A. M. A.]

In the first generation of the family described by Rosett, myotonia congenita and psychopathies coexisted in the same person, but in the second generation there is a clear-cut segregation of the two disorders, each becoming associated with a definite physical type of person; three individuals of a certain type became affected with Thomsen's disease, and the other three, of a different physical type, became affected with

psychoses. In the third generation the psychosis, as well as the physical type associated with it, are eliminated. Four new types appear, each represented by one individual who has inherited from a respective parent, not a blood relation of the affected family, that parent's physical type and normal constitution. The rest of the members of the third generation are all of the myotonic type of the second generation, and they are all, with the possible exception of one who has not been studied, affected with myotonia. Rosett suggests that the mendelian phases of the family described may help to throw some light on two of the pathologic features of Thomsen's disease—the abnormally large musculature usually associated with it, and the muscular atrophy which is sometimes observed. Three of the nine cases described have suffered no physical discomfort from the disease, which they are almost certain to transmit to their posterity. Finally, one patient suffered from a form of Thomsen's disease which has greatly facilitated the study, and has to a great extent explained the mechanism, of the abnormal muscular action. The other is an instance, no one knows how rare, in which the manifestations of the disorder are evoked by strong psychic stimuli only. If it were not for the fact that this patient is a member of a myotonic family, and that she belongs to a group of persons marked by certain physical characteristics, the examination would have been inadequate, and her trouble would almost certainly have been regarded as a form of hysteria. The cases reported are analyzed in great detail.

Söderbergh, G. MYODYSTONIC REACTION. [Act. Med. Scand., May 31, 1922, LVI, No. 5.]

Söderbergh found the same reaction which he described previously in Wilson's disease in a case of pseudosclerosis. The reaction consists in clonic or tonic contractions of muscles after faradic stimulation of muscles (or sometimes of nerves or even galvanic stimulation) had stopped. The reaction may be valuable in determining an organic lesion, although it is not yet certain whether it is pathognomonic for lesions of the central ganglia of the brain.

Urechia, C. I., and Graff, S. PITUITARY EXTRACT AS MUSCLE TONIC. [Annales de Médecine, 1922, Vol. XII, p. 84.]

Urechia and Graff advocate pituitary extract in treatment of parkinsonism and somnolency. Their extensive tests indicated that it has a decided influence on striated muscle, increasing the energy and the amount of work accomplished.

Muskens, L. J. J. MYOCLONIC REFLEXES. [Ned. Tijds. v. Genees., Feb. 3, 1923, I, No. 5.]

Muskens analyzes the mechanism of the latent and refractory period with myoclonic reflexes and experimental epilepsy as studied on cats and other animals, with and without drugs.

Flarer, F. THE TONE OF THE VOLUNTARY MUSCLES IN TUBERCULOSIS. [Arch. di. patol. e lin. med., Dec., 1922, p. 596.]

F. Flarer employed Mosso's myotonometer for estimating the degree of muscular tone in pulmonary tuberculosis. All forms of the disease were represented, one or both lungs being affected, and some of the patients being cachectic and others in a good state of nutrition. Flarer found that there was no relation between the muscular tone and the size of the muscle. Tracings characteristic of hypertonic muscles were obtained in individuals with small muscles, in whom the general musculature was not well developed, and atonic tracings were found in men and women with well developed muscles and in a good general state of nutrition, indicating the importance of the nervous system in the production of muscular tone. Flarer maintains that the statement made by many writers that tuberculous patients have atonic muscles is not correct, though it is true that muscular atony is present in some very advanced cases; it is due to anatomical changes in the muscle fibers. On the other hand, it is not found in cases of tuberculosis in which, either because the morbid process is of recent onset, or because it has not a destructive tendency, no muscular atrophy or degeneration were present.

Lemaire, H. NON-CONGENITAL MYATONIA IN AN INFANT. [Presse Médicale, XXX, Oct. 25, 1922, p. 921.]

Lemaire reports a case of non-congenital myatonia in an infant to the Paris Pediatric Society. The child was normal up to the age of six months, then convulsions came on and persisted for three months. During the next year there was a gradual appearance of a clinical picture exactly resembling Oppenheim's congenital myatonia: Generalized muscular atrophy, loss of reflexes, generalized muscular atonia, exaggerated articular laxity, and diminution of electrical excitability to Faradism without any galvanic change. At the age of three and one-half years all these symptoms underwent a spontaneous regression. Now at four years the child can support its head and sit up, and is beginning to walk. His intelligence is very lively, and electrical examination shows no anomaly. [Leonard J. Kidd, London, England.]

Moser, E. TREATMENT OF MUSCULAR SPASM AND CONTRACTURE. [Med. Klin., June, 1922, XVIII, No. 25. J. A. M. A.]

Moser calls attention to his success in curing spasm in the digestive tract by injection of an anesthetic. Postoperative ileus has been cured by intraspinal injection of an anesthetic. With contracture of joints, intramuscular injection of an anesthetic may cure completely and permanently, as he shows by a number of examples. It often aids in correction of talipes, contracture of fingers, trismus, etc., and he regards it as indispensable in correction of luxations, and to facilitate endoscopy.

Presacral injection of 130 c.c. of a 0.1 per cent procain solution has cured chronic constipation in numbers of rebellious cases. Injection of the anesthetic into the pylorus cured permanently a case of pains and vomiting—sometimes with blood—after eating. The pylorus could be palpated as abnormally thick in this young woman. In another case the stomach disturbances of two years' standing subsided at once after injection into the tough pylorus of 4 c.c. of a 0.5 per cent solution of procain, from two separate points. Similar success was realized in cases of stenosis of the small intestine or impacted gallstones; the patients vomited the contents of the duodenum or jejunum, and great relief followed.

Williams, B. W., and Dykes, S. C. OBSERVATIONS ON CREATINURIA AND GLYCOSURIA IN MYASTHENIA GRAVIS. [Q. J. M., 1922, LX, 269.]

In four cases of myasthenia gravis creatinuria was present, even on creatin-creatinin-free diet. Inability to deal with comparatively small amounts of creatin, given by mouth, was noted in two cases. In two cases a somewhat low muscle creatin percentage was found. Evidence of a low carbohydrate tolerance was obtained, as shown by an abnormally prolonged high blood-sugar curve after 100 gm. of glucose. Since levullose produced no rise in the blood-sugar, it is suggested that the defect in carbohydrate metabolism is located in the muscles and not in the liver. Creatinuria seems to be a constant finding in myasthenia gravis.

Patrzek, F. ATYPICAL FORM OF MYASTHENIA GRAVIS PSEUDOPARALYTICA COMBINED WITH SCLERODERMA AND WEAKNESS OF THE ADRENAL SYSTEM.

Mathias, E. PATHOLOGY OF THE MYASTHENIC DISORDER. [Zschr. f. d. ges. Neurol., LXIII, 155, 171.]

The authors report upon a case of myasthenic disorder in a woman of thirty years in whom death occurred as usual in similar conditions by paralysis of respiration. Patrzek reports as clinical symptoms absence of the electrical myasthenic reaction, the presence of atrophy in the shoulder muscles suggestive of dystrophia musculorum progressiva and the absence also of that quick fatigability characteristic of the muscular areas affected with myasthenia. Scleroderma had manifested itself in face, hands, feet, preceding the symptoms of myasthenia by about two years. Symptoms of weakness of the adrenalin system were pigmentation in the skin of the face, but not in the mucous membrane of the mouth or cheeks, lowered blood pressure, diminished sugar content in the blood. Neither of these latter symptoms was affected by injections of adrenalin. The diagnosis could be made only through histological examination of an excised bit of muscle, which Mathias carried out. He discovered the well known interstitial infiltration of lymphocytes and the light colored cells of Knoblauch. Necropsy revealed also variously

advanced degrees of degeneration in individual muscle areas, pale, grayish white and white discoloration. The areas which showed the most pronounced alteration were the pharyngeal and esophageal musculature, the diaphragm, the pectorales and the serrati antici, while the leg muscles were better preserved. The suprarenal as well as the other endocrinous organs were found intact (the thymus had completely disappeared). Yet both authors believe that the disorder had an endocrinous basis. Its combination with scleroderma confirms this as do other facts which in general testify that myasthenia like other diseases of the muscular system belongs among the endocrinous disturbances. It forms a connected clinical complex with these other muscular diseases and is like them of heredodegenerative character. Others have recognized such combination of myasthenia with symptoms of muscular dystrophy, also other atypical myasthenias, presence of muscular dystrophies or Addison with scleroderma or Addison, scleroderma and muscle atrophy in combination. Mathias defines this myasthenia anatomically as "myopathia alba lymphatica (asthenica)" in accord with the conception shared with Gruber and Schenk that myositis ossificans is a "myopathia chronica osteoplastica" and that there is a "myopathia dystrophica adiposa" and a "myopathia fibrosa retrahens."

Maiweg, H. PROGRESSIVE MUSCULAR DYSTROPHY AND THYROIDHYPOPLASIA.
[Zschr. f. d. ges. Neurol., LXIII, 107.]

Maiweg gives the following symptoms in a typical familial dystrophy in a six year old boy with hypothyroidism: Loss of interest, deficient mental development, stupid facial expression, impalpable thyroid, under developed height, deficiency in weight, thick, brittle dry skin with increased electrical resistance, tongue thick, lips protruding, neck short and thick, good supply of fat in spite of diminished nutrition, coagulation time shortened, mononucleosis with slight eosinophilia and increase in transition forms, development of bone nuclei of hand and knee joints deficient according to the radiograph, skull large, characteristically deformed. Six months treatment with thyroid brought marked recession of these hypothyroid symptoms with very positive improvement of the muscular dystrophy. The progress of the symptoms was checked and the pseudohypertrophy of the quadriceps yielded, there was improvement in getting up from the floor, ability at last to walk upstairs, lessening of the waddling gait. The writer discusses at length the relation of this improvement to the treatment. The possible connection between hypothyroidism and progressive muscular dystrophy is supported by the fact that case histories up to this time make mention of mental defect, infantilism, skeletal anomalies, enlargement of the tongue. Maiweg further suggests that with two of the myopathies which are not very different from the progressive dystrophy, that is myotonic dystrophy and myasthenia, as a rule symptoms of endocrinous origin are present. Also in the most different endocrinous disturbances muscular disorders are noted, pseudohyper-

trophy, lumbar lordosis, etc. Reference is made also to the question of the sympathetic and autonomic innervation of the striated muscles and the relation of this to the endocrinous organs.

Weigeldt, W. ELECTROMYOGRAPHIC STUDIES OF MUSCLE-TONE. [Deutsch. Ztschr. f. Nervenheilk., 1922, LXXIV, 129.]

As a result of electromyographic studies of various abnormal states of muscle-tone in cases of nervous disease, Weigeldt comes to the following conclusions. A differentiation of muscle-tone into distinct forms is not possible by this means. Neither clinically nor electrographically can tone be considered as a simple phenomenon. All degrees of muscular hypertonus may occur without the presence of any action current whatever. This applies to the rigidity of both pyramidal and extra-pyramidal diseases. The author employed non-polarizable electrodes applied to the skin. These results differ fundamentally from those recorded by Rehn, and it is clear that little exact knowledge on electromyography exists. [F. M. R. Walshe, Med. Sc.]

Pitzman, Marsh. A WORKING HYPOTHESIS AS TO THE CAUSE AND CURE OF PERNICIOUS ANEMIA. [Jl. Missouri State Med. Assoc., Dec., 1922.]

Of the definite and severer forms of this disease, according to the consensus of authorities, the present status may be summed up "Pernicious anemia is an ideopathic disease that progresses slowly, usually with remissions, to a fatal outcome." In view of the eventual failure of all of the present known methods of treatment, it seems only reasonable to consider seriously any proffered suggestion as to etiology, for such may obviously contain within itself the rationale of the prevention and even the cure. The characteristic triad of symptoms, universally accepted, are the anemia, the gastrointestinal upsets and the nervous symptomatology. The first theoretic possibility is that an unknown poison acts on the blood, alimentary tract and nervous system, the second that a failure in one of these systems is the cause of the disturbance in the two others. All researches along the first line of possibility have resulted negatively, which increases the possibility that the cause is to be found primarily in the failure of one of the triad—either the blood or the alimentary tract or the nervous system.

Any one of these three might with equal theoretic probability be the cause, the changes in the remaining two systems being the effect. Based on the literature the first element eliminated as a possible cause was the nervous system, more specifically because whenever the sequence of onset is noted, the nervous symptoms always follow and never precede the anemia and gastrointestinal upsets. And now as a guide between the remaining two propositions, as to whether this peculiar anemia causes the gastrointestinal symptoms or vice versa, our logical step would be to determine, if possible, which occurs first. Obviously in

a disease with gradual onset, the majority of patients by the time they consult their physicians, have both the anemia and the gastrointestinal upsets, and very commonly nervous symptoms in addition. But my point is that whenever the sequence of onset has been scientifically checked in undoubted cases of pernicious anemia, the gastrointestinal changes have preceded the very beginnings of the anemia. For example one observer, from the appearance of the tongue, has been able to prophesy the eventual onset a year before changes occurred in the blood, while a number of our ablest observers have reported cases of achylia gastrica, with normal blood picture proven, which gradually went over into pernicious anemia. In view of the 99 per cent plus of achylia gastrica coexistent with pernicious anemia reported in the literature, it does not seem unreasonable to argue that any case without a very marked decrease in the hydrochloric acid secretion is not genuine pernicious anemia.

Admittedly many observers have come to the tentative conclusion that the omnipresent achylia gastrica and gastrointestinal disturbances are the cause of the anemia and have only weakened in their faith after their system of proof failed. Now the originality of the author's conception consists in placing the blame not as customary on mistakes in the theory, but on glaring and universal faults in the method of proof. For example it is the custom in practice and in theory to maintain that it is impossible to give artificially as much hydrochloric acid as the normal stomach secretes. If given in a single dose this contention is true, but why not try it out in physiologic dosage, dilution and interval? Say 15 to 30 drops dilute HCl in half glass of water, at half hour or shorter intervals as tolerated by patient, first dose with meal and dosage continued until stomach had probably emptied itself. In addition a dose of active pepsin following each meal might be helpful in some cases and would not harm any. On this regimen the disabled stomach might perform its function properly and what is of equal importance the liver and pancreas would pour out their secretions normally in reaction to the acid chyme in the duodenum. When it is considered that it takes over 20 drops HCl before free acid appears in an average glass of milk, the inadequacy of previous dosage and the conservation in that advocated are apparent.

The four clinical cases briefed in the report have demonstrated that these patients will take materially larger doses of HCl when given as suggested than can possibly be given under the former rules. Of course, a few cases observed over short periods, in so variable a disease, are far from conclusive to anyone, but it is suggestive that *all* clinical reactions were fully up to the theoretic probabilities. Through a misunderstanding arsenicals were continued in one case, but this patient did not improve as regards blood and nervous findings until after the arsenicals were discontinued. Which makes the author insist that for scientific deductions, any combination treatments are valueless. [Author's abstract.]

Drinker, C. K., Drinker, K. R., and Lund, C. C. THE CIRCULATION IN THE MAMMALIAN BONE MARROW, WITH SPECIAL REFERENCE TO THE FACTORS CONCERNED IN THE MOVEMENT OF RED BLOOD CELLS FROM THE BONE MARROW INTO THE CIRCULATING BLOOD AS DISCLOSED BY PERFUSION OF THE TIBIA OF THE DOG AND BY INJECTIONS OF THE BONE MARROW IN THE RABBIT AND CAT. [Am. J. Physiol., 1922, LXII, 1. B.]

In this extensive investigation the functional activity of the bone marrow has been studied by the method of perfusion and injection. The paper, which is illustrated by a number of instructive drawings, will repay careful study. The main conclusions arrived at are as follows: The capillaries conducting blood in the bone marrow of the mammal in a condition of normal blood formation are closed structures, lined throughout with epithelium, and not in communication with the marrow parenchyma. When there is a very active red blood cell formation, the delicate walls of these capillaries are grown through by irregularly placed red cells in varying stages of maturity. The capillaries thus become, for a period of varying length, open structures. But the opening presented does not result in flooding the marrow parenchyma with blood because of the dense packing of the immature blood cells, which is an essential phase in process of encroachment upon the capillary wall. The stimulus causing growth of red blood forming tissue is thus responsible for the delivery of the red blood cells to the circulation.

In an editorial comment on this paper and one by F. Sabine (Physiol. Rev., 1922, II, 38) the J. A. M. A. says: "During all periods of life there must be a more or less continual formation of red blood corpuscles, the hematopoiesis being greatly accelerated under conditions of stimulation such as are caused by hemorrhages and certain other pathologic states. It is generally agreed that in the adult the seat of formation of the erythrocytes is the red marrow of the bones. Most of the evidence regarding this important function has been derived from histologic studies; and much remains to be learned. Among the debates, for example, is the question as to whether the red blood corpuscles are intravascular or extravascular in origin. A recent reviewer has remarked that the study of the blood at the present time has passed beyond the morphologic stage and is part of the development of modern experimental cytology. In this study, it is added, the anatomist and the pathologist meet on common ground. Some of the difficulties inherent in the experimental investigation of the function of the bone marrow have been mastered by Drinker and Lund by an elaborate technic involving actual perfusion of the bone marrow. In this way it has become possible to follow more adequately the movements of the red cells from the latter, and to appreciate some of the factors concerned in their genesis. It has become clear thereby that the capillaries conducting blood in the bone marrow of the mammal in a condition of normal blood formation are

closed structures, lined throughout with endothelium, and not in communication with the marrow parenchyma. Under conditions of active red blood-cell formation, the extremely delicate walls of these capillaries are grown through by irregularly placed red cells in varying stages of maturity. According to Drinker and his colleagues, the normal mature erythrocytes are delivered to the blood stream through the extraordinarily thin endothelial membrane lining the capillaries. This process, he states, must occur constantly and under the influence of such slight difference in pressure between the outside and inside of the blood vessels as to cause no actual vascular rupture. The perfection of a method of studying a tissue like a marrow-containing bone under physiologic conditions subject to variation at the will of the investigator is likely soon to bring new knowledge into a field still awaiting extensive cultivation."

II. SENSORI-MOTOR NEUROLOGY.

8. NEUROSYPHILIS.

Lafora, G. R. NEUROSYPHILIS. [Siglo Médico, June, 1921, LXVIII, No. 3524.]

This well known Spanish investigator makes a definite denial that general paresis and tabes can be cured by proper treatment. He declares that no authentic instance of a permanent cure has ever been published, although the long remissions and periods of improvement often simulate a cure. But the disease always flares up again sooner or later. The best results are obtained usually, he continues, with intraspinal treatment, and the earlier it is instituted the better the results. The disease can now be detected before a clinical diagnosis is possible, during the stage of latent meningitis. He ascribes the benefit from intraspinal treatment to the reactional process in the meninges which renders the plexus more permeable to drugs given by the vein.

Flamini, M. MYATONIA CONGENITA WITH INHERITED SYPHILIS. [Pediatrics, December 1, 1921, XXIX, No. 23.]

This comparatively rare syndrome is here described as a sequel of inherited syphilis. It occurred in an infant, and his paper is illustrated with anatomical findings.

Parker, Harry L. JUVENILE TABES. [Am. Arch. of Neur. & Psych., 1921, V, 121.]

A clinical picture like the tabes dorsalis seen in adults was noted in a certain number of children with syphilitic parentage and positive findings of syphilis examined at the Mayo Clinic. This suggested the problem of investigating the literature of the past twenty years for reports and dis-

cussions of similar cases. A large amount of literature has been written on the subject of juvenile tabes and the authors agree on many points, such as the symptomatology and physical signs. Remak, in 1885, described the first case of the disease. Later many other cases were recorded in series by Hirtz and Lemaire, Cantonnet, Lasarew, and Marburg. There no longer remains any doubt as to the existence of such a disease; moreover, many points were established to distinguish it from the adult type.

Juvenile tabes is more rare than juvenile paresis; there are about ten cases of the latter to one of the former in any group of juvenile neurosyphilitics. Juvenile tabes dorsalis due to inherited syphilis is much more common than that due to acquired syphilis. In all cases a close study of the serology of the patient and his immediate relations is essential, as more stress is laid on the presence of syphilis than any one other physical sign, such as ataxia. There is no especial sex difference, although tabes dorsalis is more common in the male adult and the average age at which the diagnosis is clear is fourteen. A child who has developed tabes dorsalis at fourteen years of age would of necessity have inherited syphilis or would have acquired it at a very early age. The history of many cases in the literature supports the idea of early infection and there are instances of persons infected at five years of age or even earlier in life. A remarkable feature of the disease is the frequency with which the parents of the child have tabes dorsalis or paresis. This introduces the question as to the specificity of spirochetes in the production of a certain type of neurosyphilis; the idea of a family predisposition to syphilitic disease of the nervous system is also suggested. The course of the disease is long and protracted, and patients who have been followed for as long as ten years have shown little change in that time provided they keep the clinical picture of tabes dorsalis. Frequently paresis develops, and once this change is instituted the degenerative course is rapid. The authors of literature on the subject agree generally on the fact that, while any symptoms found in the adult type of the disease may be present in the juvenile, there is a different degree of frequency of the symptoms and signs and also a different order of their occurrence. Incontinence of urine and bed wetting were considered the earliest and most frequent symptoms, but next in importance are optic atrophy and blindness. Optic atrophy is more common in juveniles than adults. Lightning pains are common and observed as often in juveniles as in adults, but are not so frequent as optic atrophy and blindness. Sensory changes were present in many of the cases recorded, but there was some difference of opinion as to their frequency and severity. Ataxia was quite infrequent and was carefully noted by all observers. Two-thirds of adults with tabes have ataxia, while only one-third of juveniles with tabes are so affected. Gastric crises were present in about 19 per cent of all cases recorded and Romberg's sign was seen in about 75 per cent. Patellar reflexes were absent in about 80 per cent; this is as common a sign as in the adult type of the disease. Nonne recorded a case of juvenile tabes with

Charcot joint. Most of the literature reviewed was written before syphilis as the direct cause of tabes dorsalis was established, and more stress was then laid on the presence or absence of certain physical signs in making a diagnosis. Since the most prominent sign of locomotor ataxia is ataxia, this was taken as a criterion of the presence or absence of the disease. Many cases were rejected because they were not ataxic, and more were included in the series as patients with tabes dorsalis than should have been only because they were ataxic. At present a positive history of syphilis, the Wassermann test of the blood, and the spinal fluid reaction are relied on. Seven cases were selected from the records of the Mayo Clinic as patients with juvenile tabes dorsalis. These were studied from the point of view of symptomatology, course of the disease, and physical signs, and were compared with the cases recorded in the past. In all seven cases Westphal's sign was present, in six some degree of diminution of sensibility was found, in four the pupils were immobile, and in three Argyll-Robertson pupils were present. In three cases there was optic atrophy and in three lightning pains. In three cases there was incoördination, and in three signs of congenital syphilis, or syphilis outside the nervous system; in three hypotonia, and in two incontinence of urine. In only one was ataxia present. The serum Wassermann was triple positive in all but one case, and in that case the spinal fluid test was positive. In six cases a spinal fluid examination was made; in half that number the Wassermann test was negative, but one of these has a cell count of thirty-six. A Lange test, performed on only one patient, had a "syphilitic" curve. Points worth noting are the frequency of pupillary and sensory changes, optic atrophy, crises, lightning pains, and incoördination. Three of the spinal fluids were negative to the Wassermann test in spite of a positive blood serum. Hypotonia was present in three cases and one patient was able to adopt the most grotesque and extraordinary postures. Four patients had large irregular pupils with no reaction to light or during accommodation. This is in contrast to the more usual myosis and Argyll-Robertson pupils of adults. The findings in the seven cases differ little from those of former authors, except that incontinence of urine was not so frequently found; meager physical signs, the long insidious course, and the rarity of ataxia in these seven patients agree well with what has been observed before. [Author's abstract.]

Smit, J. H. SYPHILITIC ORIGIN OF EXOPHTHALMIC GOITER. [*Nederlandsch Tijdschrift*, January, 1921, I, No. 2.]

This author contributes a study to syphilitic thyroiditis as causative of exophthalmic goiter. Two cases are recorded in which a cure followed specific treatment. His patients were women of thirty-four and fifty-two with typical toxic thyroiditis, insomnia, etc., pulse rate 140, blood pressure 60 and 140, and sluggish pupil reactions. One patient with a syphilitic deafness in addition to her Graves' disease was cured of the deafness.

Staemmler. NEUROSYPHILIS. [Deutsches Archiv für klin. Medizin, July, 1921, CXXXVI, 5-6; J. A. M. A.]

The necropsy findings in one of Staemmler's two cases showed acute syphilitic meningitis in the young man, which had begun two and a half months after primary infection with syphilis. The acute onset, the fever and other symptoms suggested tuberculous meningitis, but no signs of tuberculosis could be found at necropsy. The oculomotor paralysis had developed before the loss of consciousness, and there was no reaction to light in the paralyzed eye. In the second case the arteries nourishing the lumbar and lower thoracic spinal cord had become obliterated eighteen years after treatment for secondary syphilis. This entailed sudden paraplegia of the legs and paralysis of the rectal and vesical sphincters, with death in seven weeks. These cases belong in the group of supposedly properly treated syphilis. Nonne found in 160 cases of cerebral syphilis that no treatment had been given in 58, and inadequate treatment in 16, while 86 had been treated according to the technic accepted as the best at the time. No benefit from neoarsphenamin or mercury could be detected in either of Staemmler's cases, although five clinicians have reported instances of rapid subsidence of syphilitic meningitis under specific treatment.

Rosenheck, C. JUVENILE TABES. [Journ. Amer. Med. Assoc., February 26, 1921.]

The author here discusses juvenile tabes dorsalis as a definite clinical entity. The extreme rarity of tabes in the young stands in striking contrast to the incidence of this disease in the adult. The early appearance of ocular symptoms has been a conspicuous feature in the majority of cases of juvenile tabes recorded in the literature. It is stated that many of the earlier observers confused juvenile tabes with Friedreich's ataxia. In the year 1910 the first necropsy record of a case of a child showing the characteristic pathological changes of tabes dorsalis was reported by Malling, thereby establishing the existence of juvenile tabes on a pathological basis. Certain marked differences have been noted between tabes in the young and in the adult. The average age at which juvenile tabes manifests itself is placed at fifteen years. The youngest recorded case occurred in an infant of three years. In general it is stated that the disease appears in youth approximately the same number of years after the primary infection as in the adult. Hereditary syphilis is responsible in the vast majority of cases. A study of the sex incidence indicates that nearly twice as many cases have been recorded in females as in males. This is a striking reversal of the incidence in adult life, in which the proportion is usually ten men to one woman. In 40 per cent of youthful cases the onset has been marked by interference with vision, which has proceeded to total blindness. This resulted from optic atrophy. Bladder disturbances have appeared early in a considerable number of the recorded cases. Defects in gait were the first symptoms in a small number only,

whereas lancinating pains marked the onset in 25 per cent. Neither crises nor girdle pains have been observed at any time during the course of the affection in the young nor are trophic phenomena recorded. The same peculiar antagonism between the development of ataxia and the ocular symptoms which has been universally observed in the adult type of the disease, appears to exist equally in the case of the juvenile tabetic. It has been aptly remarked that no symptom occurs in juvenile tabes which is not observed in the disease in the adult. As in the adult, the prognosis is excellent as regards life, but extremely bad in respect of vision.

Edhem. TERTIARY SYPHILITIC FEVER. [Bulletins de la Société Médicale des Hôpitaux, July, 1921, XLV, No. 27.]

In this clinical paper the author discusses the occurrence of attacks of fever, gastralgia, and vomiting which had returned once to three times a year for ten years, lasting each time for four or six weeks, in a man of sixty-five with tabes. Specific treatment resulted in a cessation of the fever.

MacFarland. PALLIATIVE CONTROL OF GASTRIC CRISES OF TABETIC NEUROSYPHILIS. [J. A. M. A., March 18, 1922, LXXVIII, 11.]

This author reports that since he has used large enough doses of chloral hydrate and bromides by rectum, and learned the safe interval of administration of this combination, he has achieved results at least as good as those with morphine in the majority of cases, and the grave risk of developing morphine addiction has been avoided. An aqueous solution of chloral hydrate and sodium bromide is prepared so that one-half ounce (15 c.c.) of the fluid contains 40 grains (2.6 gm.) of each drug. For persons weighing more than 150 pounds as much as 60 grains of each drug at one dose may be administered. The injection is introduced six inches into the rectum by gravity pressure, through a catheter. The administration of the chloral and bromide gives relief from both pain and vomiting for from two to five hours. In no instance has the development of an appreciable immunity to these drugs been noted. Gastric lavage seems to be a valuable adjunct to the treatment.

Samovici, M. ARSPHENAMINIZED SERUM IN NEUROSYPHILIS. [Revista Médica del Rosario, July, 1921, XI, No. 3; J. A. M. A.]

Samovici ascribes the "salvarsanized serum" technic to Marinesco, saying that the latter has been applying it for ten years. In the more than 600 intraspinal injections of the kind in his service there has never been a mishap. A few cases have presented an aseptic meningitis, but no microorganisms could be cultivated from the fluid. Marinesco's experience has been that the best results can be anticipated in the mania and melancholia form of general paresis; 50 per cent of his thirty cases showed improvement. When the mind is failing, the outlook is less

favorable. He gauges the improvement by repeating systematic tests such as giving the patients sentences to fill out with the missing verb, or sentences stating palpable untruths, or asking the patient to name the opposite term, "sweet" when "sour" is named, "white" or "black," etc., or noting whether he notices the lack of doors and windows in the sketch of a house. By comparing the responses and the cerebrospinal fluid and other findings before and after, the benefit under treatment can be estimated. Tabes seems to be less amenable, but in incipient syphilitic paraplegia the improvement may put the patient on his feet again. He usually gives a preliminary intravenous injection and follows with the intraspinal injections once a week. He advises to resume the treatment after two or three months' suspension and continue until the biologic reactions are negative. This could not be accomplished with intravenous injections alone, but with this intraspinal technic the lymphocytosis and the Wassermann reaction may subside.

Burrow, Fleming. FAMILIAL TABES DORSALIS. [Journ. of Neurol. and Psychopath., November, 1920.]

In this clinical study the subject of familial tabes dorsalis is discussed. The author describes a family of eight, born of healthy parents. Two children died in infancy, six have survived. Four of these, two males and two females, acquired undoubted syphilis from various sources with the result that tabes dorsalis developed in all. A fifth member of the family acquired gonorrhoea (syphilitic infection being doubtful) and probably has early tabes dorsalis. A sixth has escaped venereal infection and remains healthy. In the light of these facts it is suggested that tabes dorsalis is not produced by a special strain of spirochete, but by a common peculiarity or by certain methods of treatment. The discovery of the spirochete acting upon tissues specially sensitized either by natural family spirochete in the tissues (brain and cord) of paretics and tabetics should stimulate further research into the other factors, still unknown, which are concerned in the production of these diseases.

Guillain, Laroche and Lechelle. BENZOIN PRECIPITATION REACTION IN SYPHILITIC CEREBROSPINAL FLUID. [Bul. d. l. Soc. Méd. des Hôp., November 5, 1920, XLIV, No. 33; J. A. M. A.]

Guillain and his coworkers describe the technic for a simple benzoïn precipitation test for pathologic cerebrospinal fluids. The reaction has nothing to do with the albumin or the cellular elements of the cerebrospinal fluid, but it always paralleled the Wassermann reaction in their numerous tests except in one case of brain tumor and in two cured cases of syphilis. A set of five tubes with the control tube is all that is necessary. In the first tube is placed 0.25 of a 1:1,000 solution of sodium chlorid; in the second, 0.5 c.c., and in the third, 1.5 c.c.; in all the others, 1 c.c. To the first tube is then added 0.75 of the spinal fluid, and to the second and third tubes 0.5 c.c. Then 1 c.c. of the mixture in the third

tube is transferred to the fourth tube, and after thorough mixing by aspirating it several times with a pipet, 1 c.c. is transferred from the fourth tube to the fifth tube. Then 1 c.c. is drawn out of the fifth tube and thrown away. The suspension of 1 gm. of benzoin in 10 c.c. of alcohol is set aside for forty-eight hours. Then 0.3 c.c. of the supernatant fluid is transferred to a tube with 20 c.c. of distilled water, and the whole is heated to 35° C. This insures an extremely homogeneous suspension, and 1 c.c. of this is added to each of the six tubes. The decisive precipitation occurs in from twelve to twenty-four hours at room temperature. The reagents and distilled water must be freshly prepared. With syphilitic spinal fluid the colloidal benzoin is completely precipitated.

Guillain. SUBACUTE AND TRANSIENT ATAXIA. [Bulletin de l'Académie de Médecine, June, 1921, LXXXV, No. 26.]

Guillain refers to a subacute ataxia developing in the course of a few hours, without any muscular paralysis, but otherwise closely resembling classic ataxia of long standing. It appears usually as the first sign of abortive tabes, and is distinguished further by the fact that it yields to treatment in the course of a few weeks although the tabes persists. His study of the subject is based on three cases which he describes. The incoordination had all the features of true tabetic ataxia, and all the three patients recovered their normal gait completely in a few weeks, under repose, mercury, and iodid. No arsenicals were given. The onset had followed an exceptional physical strain in each case. [J. A. M. A.]

de Stefano, S. CRANIOTABES. [Pediatria, July, 1921, XXIX, No. 14.]

Fifty-two cases form the basis of this study. They justify, he asserts, the assumption of inherited syphilis in every case. Over 71 per cent of all presented clinical and C.S.F. signs of syphilis.

Richter, H. PATHOGENESIS OF TABES. [Sch. Arch. f. Neur. u. Psych., 1921, IX, No. 1.]

This author, following the indications of Jahnel, has studied the localizations of the spirochetes. He says that the primary settling of the spirochetes in the poorly vascularized sheath of the root of the spinal nerve is the typical lesion. The tissues react with granulation and the nerve suffers. The lesions in the nerve correspond to the locations of the spirochetes.

Acuna, M., and Macera, J. M. JUVENILE TABES. [Arch. de Médecine des Enfants, April, 1922, p. 224.]

In this clinical record a boy of twelve with inherited syphilis first complained of swelling and pain in the knees. Fracture of the femur then followed and symptoms suggesting tabes also proceeded. Under arsphenamin the process seems to have been arrested, although no change in the C.S.F. formula has been achieved.

Lemierre, A., et al. TABETIC ARTHROPATHY. [Bulletins d. l. Soc. Méd. des Hôpitaux, July, 1921, XLV, No. 26.]

This tabetic arthropathy was the first symptom developing in a man of fifty-one years. In a few days it had caused complete dislocation of the joint, with fever. The diagnosis at first had been lymphangitis or phlebitis. Agonizing pain in the calf had been the first symptom, followed by hot, red edema of the entire leg, high fever, and delirium. The local phenomena partly retrogressed but the fever persisted, with retention of urine and atrophy of muscle. The end was hastened by pneumonia in less than two months from the first symptoms. Several similar cases are known, but this is the only one in which the histologic findings were noted. They indicated an acute diffuse syphiloma of the joint with necrosis, the tabes imprinting special features.

Rembe. TREATMENT OF GASTRIC CRISES IN TABES. [Münchener medizinische Wochenschrift, Vienna, July, 1921, LXVIII, No. 30; J. A. M. A.]

Rembe describes a case of tabes in a man past forty, in which by means of paravertebral injections of antipyrin the gastric crises were checked, and have not reappeared during the nine months that have elapsed since the last injection. The patient feels perfectly well.

Herschmann, H. PARESIS IN THE AGED. [Med. Klinik, October 9, 1921, XVII, No. 41.]

Senile involution when complicating the paretic process presents special features which the author here analyzes. Twenty-one of eighty-four such cases in the Vienna Psychiatric Clinic were of from twelve to over forty years' standing. In 27 per cent delusions of persecution were prominent, and this trend seems to be a predominantly senile sign. Occupation delirium was frequent and the animal fauna types were frequent although alcoholism was rare. Other typical senile psychotic signs were frequent.

Martinez, W. JUVENILE PARESIS. [Revista Médica del Uruguay, July, 1921, XXIV, No. 7.]

In this communication dealing with a patient who had an alcoholic father and syphilitic mother, the paretic picture was complete at seventeen. It was possibly precipitated by a severe head trauma.

Bastiaanse, van Bouwdijk. DEMENTIA PARALYTICA, OR LUES CEREBRO-SPINALIS WITH MANIC-DEPRESSIVE PSYCHOSIS. [Nederl. Tijdschr. v. Geneeskunde, August 20, 1921, LXV, 2029.]

The writer reports the case of a man, fifty-two, who was admitted almost unconscious; he had a bedsore of about 6 cm. He cried out when this was manipulated. After six weeks of nasal feeding he gradually came to himself. He was now strongly negativistic and inhibited,

dirty, and ethically deficient; loss of pupil light reaction; no affection of speech or writing; no other nervous signs. His spinal fluid showed strongly positive the "four reactions." Without any special treatment his weight doubled in six months; he was sent home but returned a few months later very depressed; he had all sorts of hypochondriacal complaints, viz., that his nose fits loosely, that his legs were blue. Soon he had ideas of grandeur; this continued for eight months, when he had erysipelas with high temperature; he was very ill for a fortnight, his temperature reaching 40.7° C. After this his psychical state markedly improved. At first there was not the slightest doubt that he had G.P.I. (yet his age was against this). But a sister of his was for some weeks treated for a severe melancholia, so that it is possible his disease was really cerebrospinal lues complicated with manic-depressive insanity. If, however, his psychical improvement was a remission of G.P.I., it is noteworthy that it occurred immediately after the attack of erysipelas. [Leonard J. Kidd, London, England.]

Wagner-Jauregg. TREATMENT OF PARESIS AND TABES. [Wiener klin. Woch., April, 1921, XXXIV, No. 15; J. A. M. A.]

Wagner-Jauregg sketches his experience with paresis and tabes during the past twenty years. He refers to his treatment of general paresis with tuberculin in combination with mercury, an account of which was first given at the International Medical Congress in Budapest in 1909. Of the patients reported on at that time, some are still living and able to follow their calling. At first the tuberculin and mercury were given separately, but later it was found that time could be saved by combining the two. Tuberculin is injected every second day subcutaneously, the object being to produce frequently temperatures of from 38 to 39 C. By this combined tuberculin and mercury treatment he was able to bring about a distinct improvement in over half of the cases treated. The proportion would of course be even larger if only the incipient cases were selected. In not a few cases a full remission is attained, so that the patients are able to resume their regular employment. Pilcz reported in 1911 that of eighty-six cases he was able to restore twenty-three sufficiently to take up their work again. In some cases the remission is permanent; in other cases recurrences take place, which however respond to repeated treatment. Of late years he has used sometimes the Besredka typhoid vaccine, instead of tuberculin, for the febrifacient, with good results. Bacterial toxins and vaccines are, however, only an imperfect substitute for the infectious diseases by which Nature sometimes effects the cure of paresis. In 1917 he began the method of inoculating paretics with tertian malaria, and as the trial proved successful, since the nine patients thus treated three are still able to do their work, he has been using the method since the fall of 1919 more extensively. The results have been the best that he has seen thus far from any method of treat-

ment. More than a dozen patients have improved to the extent that they are able to attend to the duties of their occupation. [See J. N. & M. D., June, 1922.]

Thompson, L. J. VALUE OF PARETIC CURVE IN COLLOIDAL GOLD TEST. [Archiv. of Neur. & Psychiatry, February, 1921; J. A. M. A.]

About 8,400 colloidal gold tests have been made in the Massachusetts State Psychiatric Institute on about 7,100 different cerebrospinal fluids. Of this number, 677 fluids gave paretic curves, and these constitute the basis for Thompson's study. His findings lead him to conclude that a paretic curve points toward parenchymatous involvement of the brain, while the milder gold curves are obtained in meningitis, vascular disease, and other conditions. The paretic curve is not only of diagnostic value, but also of prognostic value.

Paulain, Demetre F. INTRADURAL INJECTIONS OF SALVARSANIZED SERUM IN GENERAL PARESIS.]

We have for some time followed the intradural serum injection method of treating syphilis of the nervous system. This method was first advocated by Marinesco and Minea in 1911, who used various serums, in vivo and in vitro. The success of the method was later confirmed by the studies of Smith and Ellis. We proceed in the following manner: Large doses of neosalvarsan (0.75 gr.) are injected intravenously. It is thought that the blood contains numerous specific antibodies, following injections of neosalvarsan, due to a spirolysis caused by the neosalvarsan. We therefore withdraw four or five tubes of blood one hour after the intravenous injection of neosalvarsan. The blood is placed in the refrigerator over night, to allow the coagulum to form, and the following day the serum is collected, through a pipet, into sterile tubes which are then placed in the water bath at a temperature of 56 degrees for half an hour. This autogenous serum is now ready for intradural injection. Care must be taken to withdraw an equal amount of spinal fluid before injecting the serum. We usually inject 10 c.c.

What is the mechanism of this serum therapy? We do not believe that the action is due to the few milligrammes of neosalvarsan that may be dissolved in the blood after the intravenous injection. The chemical analyses made by our collaborator, Popesco, reveal only traces of neosalvarsan in the red blood corpuscles, none whatever in the serum. Nevertheless, the salvarsanized serum, both before and after heating on the water bath, gives a positive Wassermann reaction, showing the existence of specific antibodies. In our opinion it is these that act on the lesions, as it is highly questionable that a couple of milligrammes of neosalvarsan could exert a curative action, especially as the portion containing the neosalvarsan—the red blood corpuscles—are not injected. The object of heating the serum is three-fold: to sterilize, to inactivate the salvarsanized serum, and to activate the antibodies. The intradural injections

are made eight days apart, never oftener. Each injection is followed by a meningeal reaction which disappears in eight days. The meningeal reaction may be very marked at first, and then diminished after each injection. Similarly, the Wassermann and globulin reactions become fainter after each injection. We have had well advanced cases of general paresis with manifest dysarthria and mental disturbances which have been completely cured after from six to seven intraspinal injections. The lymphocytes have been reduced from 260 to 6 per c.c. (Nageotte), and in some of these cases the Wassermann reaction has become negative. [Author's abstract.]

III. SYMBOLIC NEUROLOGY.

2. EPILEPTIC STATES.

Paris and Vernet. MARRIAGE AND EPILEPSY. [Revue Médicale de l'Est, Feb. 1, 1922.]

These authors maintain that it all depends on the family history, whether epileptics should marry. If this is good and no marked signs of nervous degeneracy are present marriage may be allowed. A marked history of alcoholism is unfavorable. But if the man is sober and temperate and the stigmata of nervous degeneration are absent in him and his family, he may be allowed to marry; for epilepsy is not necessarily hereditary, although, as is well known, epilepsy may be substituted in the descendants by other forms of nervous want of equilibrium, not perhaps so disabling as epilepsy, but of importance from the social point of view. Out of 33 epileptics whose family history was known, 18 gave a history of alcoholism in the father.

Specht, O. SUPRARENALECTOMY IN EPILEPSY. [Beiträge zur klin. Chirurgie, CXXV, p. 347.]

This observer concludes from his experimental research that there is no justification for suprarenalectomy in treatment of epilepsy.

Bossert, O. TREATMENT OF CONVULSIONS IN CHILDHOOD. [Klin. Woch., April 16, 1923.]

O. Bossert records his experience of the treatment of convulsions in children. He recommends first a dose of castor oil. All sources of external irritation should be avoided, and a sedative given; the author specially recommends chloral hydrate (for a child of four to six months of age he recommends 0.5 gram of chloral hydrate, with mucilage and water up to 25 c.c., given as an enema). After a quarter of an hour the child usually falls asleep, but if not, then the enema may be repeated in an hour. Magnesium and calcium salts are believed to diminish nervous irritability, and a subcutaneous or intramuscular injection of

pure magnesium sulphate dissolved in recently distilled and sterilized water often causes a permanent improvement as regards the convulsions. This injection may be given once daily for several days. In place of magnesium sulphate injections, calcium salts may be given by the mouth. Human breast milk feeding tends to prevent convulsions, and therefore should be advised in the case of children under the age of six months. In the whey of animal milk salts are present, the author believes, which tend to cause convulsions. Many children are so sensitive to their influence that even small quantities of animal milk cause convulsions. Hence animal milk should be excluded from the diet at first. But in young children a milk-free diet can only be continued for a few days, hence medical treatment is necessary, so that animal milk may be soon added to the diet. In children over six months old a mixed diet may be given. Phosphorated codliver oil is of service. In true epilepsy the mixed bromides are recommended. Salt in the diet should be restricted. If bromides fail, a combination of luminal and bromides is suggested. In certain minor forms of epilepsy caffeine has been found useful.

Leahy. EPILEPTIFORM MANIFESTATIONS IN ENDOCRINOUS DISORDERS.

[N. Y. State Jour. of Med., Jan., 1922, XXII, No. 1. J. A. M. A.]

In the seven cases cited by Leahy, there appeared to be a definite relation between deficient ovarian secretion and epileptiform attacks, and between dyspituitarism attended by deficient secretion and epileptiform attacks. Practically all of the cases showed more than one glandular involvement. Striking physical abnormality was absent, except in one case. There were four cases showing a small sella turcica, one of which showed in addition calcification of the pineal gland, and another calcification of the posterior lobe of the pituitary gland. The cases showing dyspituitarism all showed the small sella turcica with the exception of one which showed the large sella turcica of acromegalic features. All these patients were given ovarian and thyroid extract with marked improvement in the majority of the cases and some improvement in the others.

Buscaino, V. M. CONSTITUTIONAL ANOMALY IN EPILEPTICS. [Rassegno di Studi Psich., Oct., 1922, XI, No. 4-5.]

The author affirms that, whereas, till in the last few years, it was possible to speak of the "genuine" epilepsy only *per exclusionem*, that is moving from the data concerning the cerebropathic epileptics, it is possible, to-day to speak directly. The numerous facts exposed, concerning the heredity of the "genuine" epileptics, their somatic morphology, the anomalies of the skeleton, of the central and of the vegetative nervous system, of the endocrine system, of the viscera, of the blood, of the metabolism, etc., leads to the conclusion that, at the sale of the cerebropathic epilepsy, it exists the constitutional, *biopathic*

epilepsy. The fundamental anomaly of the biopathic epileptics consists, as far as we presently know, in a process of dysthyroidism, which leads to the penetration into the bloodstream of anormal proteins of dysthyroid source, to the sensibilization of the organismus again them, and to the accessual explosion of functional crises of anaphylactic type: all that in subjects of anomalous constitution. The anormal thyroid proteins are microscopically recognizable with the greatest facility. Many cases of symptomatic epilepsy are but cases of biopathic epilepsy in subjects suffering of others pathological forms (arteriosclerotic dementia progressive paralysis, idiocy, uremia cerebral tumors): in those cases also the epileptiform fit is but an anaphylactic crisis, provoked by the penetration into the bloodstream of anomalous proteins of dysthyroid source. This conception reverberate into the field of the therapeutic applications, where, as for the symptomatic manifestations, the various means of antianaphylactic therapeutics have result efficacious: especially, till now, the *luminal*. Surer results will be obtained for the future by improved antianaphylactic methods. With reference to the kausal therapeutics a precise indication arises: the more or less complete thyroidektomy, with the aim of suppressing the source of the anormal proteins, and successive use of thyroid tabloids. Some analogous essays have been made with good results. [Author's abstract.]

Targowla, R. MENTAL DISTURBANCES AND EPILEPSY OF CARDIAC ORIGIN. [Paris Méd., Oct. 28, 1922, XII, No. 43.]

This author refers many psychotic disturbances seen in cardiopathies to insufficiency of the liver. Other cases show a relation of similar symptoms to high blood pressure.

Della Torre, P. L. EARLY TRAUMATIC EPILEPSY. [Archivio Italiano di Chirurgia, V, No. 4, p. 349.]

War casualties offer these nine cases for analysis. Epilepsy developed in 9 per cent of those wounded in the head during this author's early experience. The regions of the skull in which trauma is most liable to be followed by epilepsy are carefully analyzed in great detail. Seven of the nine were cured by operation and all have resumed their regular occupation.

Goldbloom, A. STARVATION OF EPILEPSY. [Canadian Med. Ass'n J., XII, No. 8, p. 539.]

Starvation treatment in order to be of service in epilepsy must be continuous, and the patient must remain in bed. The explanation offered is that the patient is kept in bed and secondly that the fictional fermentative and putrefactive intestinal processes are reduced to a minimum. The author has no notion of what starvation may do to the unconscious ego.

Darling, I. A. PHENOBARBITAL TREATMENT OF INSANE EPILEPTICS. [Am. Arch. Neur. & Psych., Apr., 1923. J. A. M. A.]

Darling reports the results of treatment with phenobarbital in a series of male patients who were classed as insane epileptics and required hospital care because of pronounced dementia or periods of extreme and dangerous violence. All of the patients treated belonged to one of four groups: idiopathic, traumatic, senile, or syphilitic. Favorable results were obtained from the administration of phenobarbital in cases diagnosed as idiopathic and traumatic epilepsy. The results in cases diagnosed as senile and syphilitic epilepsy were doubtful. Phenobarbital is not to be considered as a "cure" or specific for epilepsy. The author suggests that phenobarbital and bromid may be combined and better results thus obtained in selected cases. It appears that phenobarbital has a cumulative effect that appears to be successfully combated by a break of two days in each week during its administration. A sudden break in the administration of phenobarbital is sometimes followed by a series of seizures. There is much less danger of such trouble if bromid is given as soon as the phenobarbital is withdrawn. One and one-half grains (0.09 gm.), given five days in each week, appears to be a safe dosage. If larger amounts are given, very careful observation is necessary to detect possible toxic symptoms early and to prevent the more serious disorders. The use of this drug may be followed by: rash, simulating measles or scarlet fever; symptoms like those of alcoholic intoxication; severe, cholera-like diarrheas; mental hebetude; delirious states, and other like troubles.

Osnato, M. PATHOGENESIS OF EPILEPSY. [Am. Arch. Neur. & Psych., April, 1923.]

This author reaches by a circuitous route, influenced by recent Italian formulations that acidosis is the responsible factor. Whether this depends on a faulty carbohydrate metabolism, or on the local production of the toxic substance from disintegrating cellular structures, secondary to vascular disturbances is irrelevant.

Fischer, H. EXTIRPATION OF ONE (LEFT) SUPRARENAL FOR CURE OF EPILEPSY. [Annals of Surgery, LXXVI, No. 2, p. 176. J. A. M. A.]

Fischer reviews the work done by Heinrich Fischer, who proved that the capacity of the body to react with convulsions is dependent on a sufficient amount of functionally active suprarenal substance. The suprarenals belong, probably inclusive of the whole chromaffin system in the body, to the convulsive mechanism. His experiments have also shown that there exists a peripheral component of the cramp mechanism in the body. The peripheral component joins with the central component in the musculature by means of the peripheral nerves. On the other hand, there exists a direct continuation between the cerebral sympathetic

system and the suprarenals by means of the sympathetic nerves. The cortex if the suprarenals, as part of the chromaffin system, is directly derived from the sympathetic. A complete cycle of the cramp mechanism is hereby formed. The author reports a case of epilepsy of long standing in which he removed the left suprarenal. Before the operation this patient had from ten to fifteen epileptic attacks every night. The convulsions were so severe that his three brothers had to hold him down to prevent him from falling out of bed. Although the patient has not been entirely cured, there is noticeable, however, a distinct improvement. The attacks which he had before the operation are now less in frequency and in intensity. He has intervals of complete freedom from convulsions.

Russell, W. TREATMENT OF EPILEPSY BY SNAKE VENOM. [South African Medical Record, XX, No. 11, p. 209. J. A. M. A.]

Ten cases of idiopathic epilepsy were selected by Russell at random, cases in which the epileptic seizures were not attributable to any definite organic cause, for treatment with a mixture of the venom of the cobra and puff adder. The number of fits per week was obtained in each case for the twenty-six weeks previous to the commencement of treatment. Treatment was begun during September, 1921. In each case 0.0015 c.c. liquid venom, in 2 c.c. of distilled water, was injected into the deltoid muscle. The injections were repeated at intervals of seven days, for seven weeks, the dose being gradually increased to 0.01 c.c. liquid venom. Owing to a delay in obtaining further supplies of venom, an interval of six weeks elapsed before treatment could be continued. No further injections were given to three female patients on account of their extreme unwillingness to undergo the pain and discomfort associated with the injections. Treatment was, therefore, continued in the seven male cases only, gradually increasing doses being given at weekly intervals for eleven weeks, until a dose of 0.025 c.c. liquid venom had been reached. In each case a record of fits was kept while venom was being given, and six weeks after the last injection. In two cases a slight decrease took place in the average number of fits per week. In one case only one fit was seen in the six months of treatment. In the remaining seven cases a definite increase in the number of fits occurred. One patient developed status epilepticus five weeks after the cessation of the injections, and died.

Toulouse, E. and Marchand, L. STATUS EPILEPTICUS. [Presse Médicale, XXX, No. 53, p. 565. J. A. M. A.]

Toulouse and Marchand relate that one of their patients died the sixteenth hour after the onset of the status epilepticus. The temperature had run up to 40.2 C. In another death occurred the tenth hour. One of their patients had 364 seizures in twenty-four hours, but Dodds counted 472 in thirty hours in one case. The status epilepticus is gen-

erally brought on by suspension of the bromid or other sedative, or by nonobservance of the restriction of salt, which is equivalent to reduction of the bromids. For each additional seizure a supplementary dose of 1 gm. of the bromid should be given, and a dose of 0.5 gm. for an attack of dizziness. Half of these doses are enough if on a salt-poor diet. The twenty-four hour total of 10 gm. (on ordinary diet) or 5 gm. (on a salt-free diet) should not be surpassed. When this supplementary amount is no longer needed, it should be stopped only slowly, dropping it by 1 gm. a day. Since this phophylactic method has been applied at Villejuif, there have been only 18 patients who had as many as from eleven to twenty seizures during the day, and none had more than this. When the status epilepticus is under way, they give 6 or 8 gm. of bromid during the first day, fractioned, about 1 gm. every three hours during the first two days if the condition continues, the third day, at four hour intervals, and the fifth day, at five. The bromid is gaged by the number of seizures, nor by the general condition. They warn in conclusion that bromin poisoning is liable to occur after any regular vigorous bromid medication. The temperature may run up high and the weakness may resemble that of status epilepticus, but the dilatation and immobility of the pupils are more pronounced in bromin poisoning.

Nevermann, H. NARCOLEPSY DURING PREGNANCY. [*Deutsche med. Woch.*, Sept., 1921, XLVII, No. 38. J. A. M. A.]

Nevermann reports a case of narcolepsy in a pregnant patient. That narcolepsy is a distinct disease, he says, is now generally recognized. The etiology is still a matter of controversy. Guleke regards narcolepsy as resting on a neurasthenic basis; Klieneberger and Stöcker think a psychopathic constitution is responsible. Others contend that it is due to a neurosis with a degenerative basis, or disturbance of endocrine function; more particularly of the hypophysis, or a vasomotor disturbance, possibly relaxation of the sympathicus. In Nevermann's case, the narcoleptic symptoms had their onset during the seventh month of pregnancy. For three days and nights the patient could scarcely sleep; after that she would fall asleep at all times during the day, whether she was working in the kitchen, employed at other housework, sewing, sitting in the street car or when reading. Often she suddenly fall asleep during a conversation; in a short time she would awake, usually with a start, and continue the conversation where she left off. Sometimes she would fall asleep when walking. All attempts to combat her sleepiness with stimulants, sedatives and organ extracts proved futile. The patient was well nourished and had no organic disease. As she approached term, the attacks became less frequent and of shorter duration. At the end of the eighth month they had about ceased, and by the close of the ninth month they had stopped altogether. In observa-

tions made in this case, Nevermann finds support for the view that narcolepsy, or at least narcolepsy associated with pregnancy, has no basis in a psychopathic constitution or in a neurasthenic diathesis and probably not in a neurosis, but is rather caused by a disturbance in the functioning of the endocrine glands, there being no evidence to indicate which glands might be affected.

3. PSYCHOSES.

Heise, H. INHERITANCE OF SCHIZOPHRENIA IN FAMILY D. AND ITS COLLATERAL LINES. [*Zschr. f. d. ges. Neurol.*, Vol. LXIV.]

Heise was able to follow the family through four generations and believes that he has proof for the recessive character of the "schizophrenia" without limitation within the generation and also that there is here in his case not a simple Mendelian but apparently a "dihybrid" character. He notes that wherever schizophrenic psychoses or those giving strong suspicion of schizophrenia, also schizophrenic psychopathies, appeared in the material under examination there was pathological inheritance on the side of both parents and in an unusually pure form chiefly as demonstrable schizophrenia. Therefore he thinks it unnecessary in order to explain the schizophrenic psychoses in this family to make use of Rüdin's hypothesis of agents for the completion of schizophrenia in form of any sort of psychotic germ.

Berger, H. PATHOGENESIS OF CATATONIC STUPOR. [*Münch. med. Woch.*, 1921, No. 15.]

The writer experimented in 11 cases of catatonic stupor with injections of cocain hydrochlorid in doses 0.025-0.05. Eight became suddenly active after only one injection but the improvement did not last more than an hour or two. Three patients whose condition had continued for years did not respond. Berger thinks that the cocain produced increased stimulability of the cerebral cortex therefore direct increase of the processes of dissimulation. His observations lead him therefore to believe that conversely the basis of the catatonic stupor is a diminution of these processes of dissimulation and of the cortical function generally. He does not accept a purely psychic origin for every catatonic stupor.

Raphael, T., Parsons, J. P., Woodwell, M. N. SCHIZOPHRENIC CATATONIA WITH ASSOCIATED METABOLIC AND VEGETATIVE FEATURES. [*Am. Arch. Neur. & Psych.*, April, 1923. J. A. M. A.]

An analytic report is made by Raphael, Parsons and Woodwell of a case which presented definite indications of primary or fundamental asthenic habitus, the gradual development of an acute schizophrenic catatonia with stupor reaction, and almost complete recovery; and which further, in strikingly phasic association, on the physiologic level, pre-

sented marked vagotonia and hyposuprarenalism, and in somewhat less degree, hypophyseal and thyroid inadequacy with evidence of general metabolic depression, essentially hypoöxidative in type. These findings strongly emphasize trends that have been noted in other acute schizophrenic reactions.

Skliar, N. CATATONIC DEMENTIA AND ITS CLINICAL FORMS. [Arch. f. Psych. u. Nervkr., Vol. LXVII, No. 1.]

Skliar presents the different clinical forms of catatonic dementia as follows: The stuporous or catatonic group in the narrower sense in which the catatonic symptoms characteristic of the entire disease are found in the purest typical form without intermixture with other symptoms. The second group is that of dementia catatonica affectiva in which many affective symptoms are added to the catatonic (manic, depressive symptoms or both together). The first group terminates in an apathetic, the second in an excited maniacal dementia. The first group may be subdivided into the stuporous (stupor in its purest form) and the apathetic subgroups (stupor in weakened, less intensive form). Each of these groups divides again into two forms of manifestation, the stuporous or the apathetic form, a simple form in which the stuporous or the apathetic condition is always present and a complicated changing form, the stuporous-agitated or the apathetic-agitated form in which the stuporous or the apathetic condition alternates with one of excitement. The affective group falls into the agitated and the manic form or into a paranoid form. The agitated subgroup is distinguished by manic-depressive symptoms and falls into three forms of manifestation, a depressive, a hypomanic and an agitated form in the narrower sense of the word with a chronic and a periodic subform. The paranoid subgroup is recognized aside from the manic-depressive symptoms chiefly through delusional ideas and through strongly marked stereotypies. [J.]

Buscaino, V. M. THREE PAPERS ON DEMENTIA PRECOX. [Riv. di patol. nerv., 1921, XXVI, 87; XXVI, 57; XXV, 197. Med. Sc.]

The first of Buscaino's papers is a review of our present state of knowledge of the morbid anatomy and histopathology of the nervous system in dementia precox. It is important because of the rich bibliography which it contains and because of the critical discussion of the results obtained by different authors in 550 autops'es. Buscaino's conclusions are: in most cases of dementia precox an abnormal constitution of the nervous system is anatomically demonstrable. The supposition that the malady may be due to inflammatory changes either of the meninges, of the blood-vessels, or of the nerve-substance is untenable. The various lesions as described by different authors can be considered as degenerative in character. In the cerebral cortex the most affected layers are the sixth, fifth, and third; but their alteration does not satis-

factorily explain the disorders of the association process so characteristic of the disease. In many cases, lesions of the corpus striatum have been observed which may account for the muscular hypertonus of the catatonic forms. The very frequent troubles in the "vegetative" sphere are probably connected with degenerative changes of the grey matter of the medulla oblongata, spinal cord, and sympathetic ganglia, to which no sufficient attention has, as yet, been paid.

The other two papers of Buscaino are chiefly concerned with the description of a peculiar lesion of the white substance of the cerebral cortex, basal ganglia, midbrain, cerebellum and pons, for which the term "acini-form areas of disintegration" is proposed. These are found among nerve-fibers, most frequently next to blood-vessels, and appear to consist of a more or less amorphous material contained within a meshwork of neuroglia fibers. Sometimes nuclei of neuroglia cells and fragments of nerve-fibers and occasionally of nerve-cells are seen either within or at the edges of the disintegration zones. For their demonstration formalin material or pieces fixed by means of 5 per cent nitric acid in absolute alcohol can be used. After embedding in paraffin, sections are stained either for 18 hours with a 1:2,000 solution of toluidin blue, or for three minutes with Ziveri's fluid (saturated solution of picric acid 100 gm. with 0.05 gm. of methylene blue and 0.10 gm. of acid fuchsin). By the first method the substance of the disintegration areas is stained violet-red, by the second bright yellow. Control specimens prepared by Spielmeyer's method for medullated fibers show, in places corresponding to the disintegration areas, zones of demyelination the central portion of which is occupied by an amorphous detritus. The disintegration areas vary in number and particularly in size, some of them being recognizable only with the help of the microscope, others reaching such dimensions as to be visible to the naked eye. The author was not able to ascertain the nature of the amorphous material to which the areas are essentially due. However, he points out that it is not dissolved by nitric acid, alcohol, or xylol, and that it does not stain with acid fuchsin, methylene blue, or eosin; it does not contain iron and does not take the silver by Bielschowsky's method. It is morphologically different from Reich's π granules and microchemically from Bonfilio's basophilo-metachromatic substance *a*. It has a certain similarity to the giant masses of basophilo-metachromatic substance observed by Baroncini in a case of atypical psychosis. (For references and details as to these various degenerative products see Alzheimer, *Histol. u. histopath. Arb. über d. Grosshirnr.*, 1910, III, 401). Generally the "acini-form areas of disintegration" appear to be due to a primary form of degeneration of nerve-fibers, which affects first the axis cylinders and then the medullary sheaths. As shown by various sets of experiments made by the author for the purpose, the disintegration areas are neither artefacts due to fixing or other reagents nor agonal or cadaveric alterations; but can be reobtained

in dogs by poisoning with formic acid. The author attributes to the described areas a considerable importance, as they might explain, better than any other lesion, the profound disorders of the association process. However, he himself points out that similar areas were observed by him, though in a much smaller number, in cases of acute delirium and G. P. I. It may be added that they much remind one of the spotty atrophy of medullated nerve-fibers described by Borda, Fisher, and Bielschowsky in cases of G. P. I. and senile dementia.

C. DA FANO.

Main, D. C. CATATONIC DEMENTIA PRAECOX. [Am. Jl. of Psych., January, 1923, II, No. 3.]

Main endorses the value of occupational therapy in this condition. He describes what is being done in this field at St. Elizabeths Hospital, Washington, D. C.

Gibbs, C. E. SEX DEVELOPMENT AND BEHAVIOR IN MALE PATIENTS WITH DEMENTIA PRECOX. [Am. Arch. of Neur. and Psych., IX, No. 1, p. 73.]

Inasmuch as developmental defects of the reproductive apparatus and anomalies of the secondary physical characteristics of sex have frequently been reported in relation to the mental deficiencies and delinquencies beginning at puberty, it appeared wise to study a series of male patients with dementia precox from this point of view. The majority of patients examined had testicles which compared favorably in size with the normal. Pubic hair of a definitely feminine distribution was present in 13 per cent of patients first admitted between the ages of sixteen and twenty. A marked deficiency of beard persisted until after twenty-one in 34.6 per cent of patients first admitted between the ages of sixteen and twenty. A study of the sex behavior of these dementia precox patients showed that a large percentage had failed to reach the adult level. The marriage rate was definitely below that of males in the general population. More important, adult relations with the opposite sex had never been accomplished by 64.1 per cent of the 120 patients who answered the questions in a satisfactory way. Only 20.5 per cent of the patients had reached an adult level of sex behavior and maintained it even for a short time, either married or single. The findings indicate a disturbance of sexual development and a failure of sexual maturity which is most marked in patients admitted to the hospital during the years of puberty and adolescence. Patients admitted at an early age give the impression of an unevenness of sexual growth, the development of the secondary sexual characteristics lagging behind that of the testicles.

Dawson, W. S. DEMENTIA PRAECOX. [Jour. Ment. Sci., April, 1923.]

Fifty cases of dementia precox are studied from the standpoints of (1) general development, skeletal growth, degeneration, stigmata, and

atavistic signs; (2) myxedematous changes; (3) sluggish circulation and cyanosis; (4) pulse rate, blood pressure, and oculocardiac reflex; (5) dysgenitalism; (6) growth and distribution of hair; (7) obesity; (8) Goetsch's reaction; (9) the pilocarpine test; and (10) the thyroid function test. There was no marked departure from the normal in physical development, and the presence of stigmata and atavistic signs was infrequent; such bodily changes as might be due to hypofunction of the gonads were uncommon; and though gross signs of thyroid disorder were rare, minor signs of hypothyroidism and hyperthyroidism were observed. In all cases reacting strongly to pilocarpine the pulse was reduced in frequency, no case showing an increase. Definite sympathetic hyperexcitability was demonstrated by the Goetsch reaction in one case only, although eighteen others gave a moderate reaction, which was, however, within normal limits. Disorders of the vegetative nervous system appear to be responsible for the chief manifestations of dementia precox, and the high proportion of vagotonics, many of whom showed evidence of adrenal inadequacy, suggest that the vagotonia is relative rather than absolute, being due to sympathetic adrenal hypofunction. An excess of choline resulting from breakdown of lipoids may also set up vagotonic symptoms. Of the 50 cases 27 were katatonics, 14 simple dementia precox, 7 paranoid, and 2 were hebephrenics.

Lorenz, W. F. SUGAR TOLERANCE IN DEMENTIA PRAECOX AND OTHER MENTAL DISORDERS. [Am. Arch. of Neurology and Psychiatry, Vol. VIII, No. 2, p. 184.]

Except in cases of active catatonia, certain cases of simple deteriorating dementia precox and several cases in which evident emotional upsets existed at the time of the test, Lorenz' investigation points to a blood sugar concentration in mental disease that is practically normal when the test is made while the patient is fasting, the average being 0.105 per cent. The response of patients with mental disease to sugar feeding is generally within normal range. Patients in the active stages of catatonic dementia precox responded to glucose feeding with a hyperglycemia that resembles the response obtained in hyperthyroidism. Several patients with simple deteriorating dementia precox responded to glucose feeding in a manner that resembles the responses obtained in certain endocrine disturbances, such as dyspituitarism. Patients suffering from manic-depressive insanity—depressed phase—responded to the sugar test with a curve higher than that found in normal subjects.

Canavan, M. M., and Clark, R. THE MENTAL HEALTH OF 463 CHILDREN FROM DEMENTIA PRAECOX STOCK. [Mental Hygiene, VII, No. 1, p. 137.]

A study of 1,000 cases of former dementia precox patients at the Boston Psychopathic Hospital revealed the existence of 463 children of the second generation, the offspring of 136 matings. Of these

children 377 were alive at the time of investigation. Aside from the usual disturbances of childhood, such as tonsillar disease, adenoids, eye and ear defects, the offspring of these dementia precox patients presented remarkably few peculiarities. Of 381 children of whom reports were obtained, 295 were normal, 4 were feeble-minded, 5 had dementia precox, 12 were backward, 12 were "nervous," 17 were physically diseased, and 36 displayed disorders of conduct. The average of the normal children is high (77.4 per cent). However, the mental disease process of dementia precox does not develop, as a rule, before the beginning of adolescence, and most of these children were under ten years of age (200), 94 were between eleven and fifteen years old, and the remaining 87 from sixteen to twenty or more. Of the 138 between the ages of six and ten years, only 41 displayed anomalies in the form of feeble-mindedness (3), antisocial tendencies (2), poor physical health (14), backwardness, insanity, poor vision, nervousness, poor articulation, temper, and fears (22 in all). Thus, 70 per cent had favorable records. Of the 94 between eleven and fifteen years of age, 67 were normal, the majority being in school or earning; 2 were backward, 1 had dementia precox, others suffered from overindulgence, were nervous, sensitive, irresponsible, or syphilitic. The group from sixteen to twenty years of age (50) contains 31 normal, progressive adolescents, 2 feeble-minded individuals, and some with tuberculosis, nervousness, nervous hearts, malnutrition, and truant, seclusive, antisocial or refractory tendencies. Of the 50, 39 were earning, the majority had completed at least grammar school, and many had had more schooling. Of the 37 over twenty years old, 26 had a good record. All but 3 were working; 2 were feeble-minded, 1 died of dementia precox, 1 was nervous as a consequence of the war, and 2 were antisocial. The 82 children who died before the investigation succumbed to birth accidents, starvation, heart lesions, infections, and accidents, *i.e.*, apparently not in consequence of dementia precox. The majority of them died before they were one year old. The 5 dementia precox patients in this series were between fifteen and twenty-five years of age, most of them being beyond the age of puberty. Two cases occurred in one family (brother and sister). The 12 "nervous" children may later develop dementia precox, and require observation. However, at the time of investigation their symptoms were not sufficient to keep them out of school, and took the form of restlessness, fussiness, excitability, fears, tics, lisping, habit defects, sensitiveness, phobias, difficulty in sleeping, lack of concentration, and postwar neurosis. The feeble-minded (4) were all children of mothers who had had dementia precox. In the case of the backward and lazy children, early feeding difficulties and depleting diseases may have been contributory factors. Some of them had eye defects. The children with physical disease suffered from rickets, syphilis, malnutrition, bronchitis, empyema and cardiac lesions. The cases of conduct disorder might be duplicated in

any group of families, being dependent upon poor home control, reactions to abuse or spoiling, and economic difficulties. Thus, in conclusion, of the 381 children, 86 deviated from the normal, either mentally, physically, or socially. In the case of these 86 deviators, the mother had been the patient in 74 cases, the father in 12. In the case of the 295 normal children, the mother had been the patient in 250 cases, the father in 45. The final conclusion must be reserved, since not all of the children had reached the determining age at the time of investigation. Later checking-up of the apparently normal cases is urgently advised.

Larsen, E. J. CHRONIC ALCOHOLISM. [*Hospitalstidende*, Vol. LXV, No. 27, p. 445.]

Larsen was unable to find anything suggesting dysregulation in eleven cases of chronic alcoholism, including four with Korsakoff's psychosis. With genuine epilepsy, dysregulation is constant and pronounced. This difference in the metabolic findings seems to exclude any direct connection between alcoholism and a predisposition to epilepsy in the descendants. The degeneracy which predisposes to abuse of alcohol seems to be of another nature from that which predisposes to epilepsy. By "dysregulation" he means an inability to maintain the normal neutrality balance.

Ely, F. A. MEMORY DEFECT OF KORSAKOFF TYPE, OBSERVED IN MULTIPLE NEURITIS. [*Wisconsin Med. Journal*, Vol. XXI, No. 3, p. 90. J. A. M. A.]

In the four cases cited by Ely there existed in the early months of pregnancy hyperemesis. In two cases, therapeutic abortion was performed at the end of the third month, and in one case during the fourth month. In one case, the patient went to the eighth month and was delivered spontaneously. In three cases, although there was abundance of evidence of profound toxemia before abortion, the symptoms of neuritis did not occur until a short time after the uterus was emptied. In one case, the patient struggled through the state of hyperemesis and just prior to spontaneous delivery during the eighth month, seemed to be recovering from her neuritis. In all four cases the clinical evidences of multiple neuritis were sufficiently classical to place the diagnosis beyond reasonable doubt. Two cases, because of temporary sphincter incontinence, suggested the possibility of spinal cord involvement, and in one case the irregular distribution of the muscular atrophies much more strongly suggested cord disease. In all the cases a loss of recent memory and unreliability of statement were very pronounced symptoms. In one case, retroactive amnesia was a prominent feature. In one case, death occurred after delivery, while in one case sufficient time has not yet elapsed to make a report possible. The patient is, however, convalescent. Two patients feel that they have never fully regained their

original powers of immediate memory, 7 and 5 years respectively, after the onset of their illnesses. One woman still has absence of the patellar reflexes and a slight tendency to foot drop. Ely emphasizes that toxic multiple neuritis is a frequent sequel to hyperemesis gravidarum. Multiple neuritis may develop during gestation or in the puerperium any dependable evidence of underlying infection. A mild psychosis of the Korsakoff type is very prone to occur in this type of multiple neuritis. Therapeutic abortion is, perhaps, too long deferred in many cases of hyperemesis and is the best remedial measure, and the most sure means of preventing multiple neuritis. The Korsakoff psychosis was recognized as a very common accompaniment of multiple neuritis following hyperemesis gravidarum, long before Korsakoff affixed his name to the same syndrome which he observed in alcoholic neuritis.

Menninger, Karl A. DEMENTIA PRECOX. [Journal of the Kansas Medical Society, Dec., 1921, pp. 381-84.]

In this presentation of dementia precox from the modern point of view the writer takes the position that regardless of whether or not it is an entity it is a pragmatically justified group of mental disease pictures. Recognizing the possibility of both psychogenic and organic causation, he suggests the probability of a future division of the present text book inclusions according to prognosis rather than according to causation. The modern tendency is, of course, to emphasize the differences according to cause with the idea that psychogenic and post-infectious syndromes of a schizophrenic stamp should be distinguished and perhaps both of them split off from the orthodox dementia precox while a splitting according to prognosis as the writer suggests is actually what Kraepelin thought he was doing when he set dementia precox apart (or rather gathered it together). The writer maintains, however, that all cases of dementia precox do not dement; that on the other hand some get permanently well while on the other hand some seem to get well but have subsequent attacks after the fashion of manic-depressive psychoses. A division into (1) a recoverable, (2) a cyclic, and (3) an irrecoverable group might lead, the author intimates, to a discovery of more accurate delimitations. The article is, in the main, the presentation of the chief features of dementia precox illustrated by case histories, designed for the general practitioner. [Author's abstract.]

Genil-Perrin, G. NEAR-PARANOIACS. [Médecine, February, 1923.]

This type of individual is by no means rare and the author argues for his better recognition by doctors as well as by the whole public. Social inadaptability is the chief feature. Distrust, pride, and wrong judgment lead to delusions of interpretation. These persons are bores par excellence and society is constantly menaced by their delusional projections.

BOOK REVIEWS

Goepfert, Hans. BERICHT ÜBER DEN ERSTEN KONGRESS FÜR HEIL-PEDAGOGIK. [Julius Springer, Berlin.]

There was once an English poet, Pope, we dimly recall, was his name, who admonished a certain St. John to awake and consider the world about him, and as a result came to the comfortable issue that this was the most perfect of worlds and all was well with the universe. Since his time, however, there have been others who would question this optimism and who would essay to make the world better and show wherein their efforts are justified. Thus various movements and congresses for curing the sick world have moved on the world's stage and finally their efforts have been reduced to the printed page.

The present brochure records one of the many of these efforts and contains a most commendable array of essays all bearing on the hope to make this world somewhat different.

To those who, with Pope, believe that this is the best possible of worlds the essays will not be inspiring or stimulating, but to others, who are not satisfied with the present order of things, much interesting, nay, even valuable, suggestions may be culled. Congress reports, as a rule, are unilluminating, but the present one contains many papers of more than usual stimulation.

Hall, Arthur J. EPIDEMIC ENCEPHALITIS. (ENCEPHALITIS LETHARGICA.) [John Wright and Sons, Ltd., Bristol. (Wm. Wood & Co., New York.)]

The greater part of this work was originally presented by the author as the Lumleian Lectures given before the Royal College of Physicians of London in 1923. This discussion has been reedited, added to, and supplemented by additional chapters giving a coherent and valuable account of this peculiar disease trend which has come to be termed epidemic encephalitis.

History, Epidemiology, Histopathology, Bacteriology, Clinical Manifestations, Later Arriving or Residual Signs, Differential Diagnosis, Prognosis and Treatment, these are the sectional subdivisions of the completed study, with seventy-five pages of bibliography and over 2,000 titles.

With this authoritative monograph in hand no one can fail to be oriented to this most fascinating of disorders, the study of which has almost entirely revolutionized certain very large chapters in modern neuropsychiatry since v. Economo first gave his detailed and remarkably accurate descriptions in May, 1917.

Hall's work is well worth while even though some most important

discussions of the neuropathological features have been omitted. In fact, if any criticism seems merited it is one that could be posited upon the author's failure to present the larger and more general neuropathological formulations. He has given us an extremely important descriptive outline, but it has not been adequately synthesized along lines which would tend to unify the enormous mosaic. This is to be regretted from numerous points of view, but perhaps one is demanding too much from one human brain.

In spite of many shortcomings from this philosophical aspect the monograph is to be most heartily commended.

Lewandowsky, M., Bumke, O., Foerster, O. HANDBUCH DER NEUROLOGIE. Ergänzungsband. [Julius Springer, Berlin. \$5.25.]

Professor Bumke, Kraepelin's successor at Munich, and O. Foerster, chief of Bonhoeffer's clinic at Berlin, have edited this additional volume to Lewandowsky's Handbuch. It contains ten contributions of unequal but of definite merit. K. Birnbaum has a very fine chapter on the Psychopathies and the Psychoses. Here may be seen at its best the author's wide and deep grasp of the intricacies of the psychical life as seen in the psychotic and the psychopath.

Bumke has a chapter on the War Neuroses which, rich in its descriptive aspect, is somewhat barren from the "deep psychology" point of view. Lange's Treatment of the War Neuroses is sound and practical even if a bit formal.

Kehrer deals with Hysteria and Neurasthenia; Redlich has an excellent chapter on Epilepsy, and Pfeifer an illuminating chapter on Psychical Disturbances from Cerebral Injuries of the War. The War Injuries of the Optic Tracts, by Lenz of Breslau, and the War Injuries of the Eighth Nerve, by Geoerke of Breslau, are important contributions.

Kramer of Bonhoeffer's Klinik writes on Aphasia, Apraxia, and Agnosia, and Stertz of Marburg contributes a detailed picture of Psychical and Nervous Diseases following Intoxications and Infections.

On the whole this additional volume to the Handbuch is a worthy companion to its well-known and highly valued forerunners.

Ricaldoni, A. LA ENCEFALITIS EPIDEMICA. [Gregorio v. Mariño, Montevideo.]

The author, professor in the faculty of medicine of the University of Montevideo, has here given in a valuable monograph of 113 pages a review of epidemic encephalitis as it has been observed in the South American republics.

He makes no attempt to reproduce the vast array of world-wide observations upon this syndrome, but his monograph gives evidence of the fact that he is thoroughly in touch with the world's literature and has made it bear upon the problems as presented by his colleagues in South America. Thus he presents interesting data of its appearance in Uruguay, in Argentina, and in other localities. His clinical

section gives a summary of the well-known syndromes present, and especially valuable is his bibliographical contribution of South American studies upon the disorder.

Stekel, Wilhelm. ONANIE UND HOMOSEXUALITÄT. DIE HOMOSEXUELLE PARAPATHIE. Dritte Auflage. [Urban und Schwarzenberg, Berlin u. Wien. 15 mk.]

A third revised and enlarged edition of this interesting work has just appeared. Certainly in clinical practice the problems connected with repressed homosexual strivings are of paramount importance. With the increasing economic strain of making a living and the delay in time of modern marriage, the human being is forced more and more towards sublimation of his heterosexual trends. Regression is constantly pressing close upon this sublimation thrust and the universal homosexual component has to be handled.

No author in modern times has so completely envisaged this general situation as Stekel, and the present volume is rich in illustration of the many faulty adjustments to the internal dynamics of this dilemma. Stekel accents two points even more sharply in this revised edition, namely, the needless bogey which has arisen anent masturbation, and further he attacks the pessimistic attitude which has heretofore regarded even overt homosexuality as an unalterable situation.

Even the most casual observer sees the homosexual problem thrust before him in numerous facets, some quite sharp, others more subtle. This is no pseudo matter; it is a vital issue in neuropsychiatry, and Stekel's monograph casts much important light upon the depths as well as upon the surface of this most perplexing series of phenomena in human behavior.

It has been more or less the mode to treat Stekel's contributions a trifle lightly. In view of the great importance of the issues involved we are not sympathetic to this gesture. Stekel has something very definite to say, and even if he says it in a dramatic manner it nevertheless is in need of saying. His work remains the most suggestive and important from the clinical side of any of the adherents of the psychoanalytic school.

Freud, Sigmund. UEBER PSYCHOANALYSE. Siebente unveränderte Auflage. [Franz Deuticke, Leipzig und Wien.]

Freud's five lectures given in 1909 at Clark University appear in a seventh unaltered edition, indicating the continued interest taken in this brochure in the home of its author.

Wittels, Fritz. SIGMUND FREUD, DER MANN, DIE LEHRE, DIE SCHULE. [E. P. Tal & Co., Leipzig, Wien.]

Sigmund Freud, His Personality, His Teachings and His School. Translated by Eden and Cedar Paul. Dodd, Mead and Company, New York. \$3.50.

Close upon the heels of this German volume comes an excellent translation which upon its English jacket says: "This book is not merely a biography of Freud: the author develops in detail the

Freudian Conception and theories and discusses them against the background of rival psychoanalytical schools. Special chapters are devoted to the personalities of Adler, Jung, and Stekel, and there is an historical and critical account of the growth of the main elements of the psychoanalytical theory—dream interpretation, repression, narcissism, etc. In no other single volume can such a complete discussion of modern Freudian theory be found."

On the cover of the German edition we read: "In this first monograph, written from the critical-historical viewpoint, Freud as the greatest of moderns is described, his surroundings, his origins, his teachings, his beginnings. Then the development of his conceptions and their spread, the conflicts and the schisms which took place in the lap of the psychoanalytic school of his own foundation, and the foundations of the hypotheses of his chief students, Jung, Adler, and Stekel. Wittels, who would see Freud as a successor of Nietzsche, here shows us the enormous changes of viewpoint concerning our present day sexual life. The misconceptions concerning Freud and the vicious criticisms concerning his teachings will be finished through this work. Freud has said: 'After my death my teachings will perish; mankind cannot stand them.' Books such as this of Wittels permit the hope that these gloomy words will not be fulfilled."

The translation has a portrait of Freud in his prime, and it also contains a delightful letter from Freud to Wittels on his receipt of a copy of the original. Here we must leave the book to the reader. He will be amply repaid for his interest and will have an opportunity of learning much of Freud and his teachings which cannot be obtained in any other way. It is a most interesting volume.

Cohn, Toby. LEITFADEN DER ELEKTRODIAGNOSTIK UND ELEKTROTHERAPIE FÜR PRAKTIKER UND STUDIERENDE. Siebente Auflage. [S. Karger, Berlin. 8 mk.]

Originally appearing in 1898, the intervening twenty-six years has seen an increasingly valuable textbook on methods of electrical diagnosis and electrotherapy now in its seventh edition. At the same time we feel that the author could have pruned his work to advantage, for much of the included older material has but historical value. We cannot feel at all in sympathy with Cohn's judgment of Bourguignons' "chronaxie" discoveries. He thinks them only of theoretical physiological rather than of clinical value. The newer work upon muscle physiology does not support this contention in our opinion, and the work would be more valuable if it presented this newer French work more adequately.

McDougall, William. OUTLINE OF PSYCHOLOGY. [Charles Scribner's Sons, New York.]

When the author tells us in his Preface that an adequate textbook of psychology can scarcely be written by one man in view of the immense mass of material which has accumulated, we can sympathize with the present effort to produce a minimum requirement for students

as an introduction to one of the most important branches of natural science.

With such a modest opening gesture we expected something a little different in the later performance. We had hoped for a tentative and pliable psychology, free from dogmatic assertion, and full of sympathy for the various trends along which contemporaneous psychology is developing. But we have been disappointed. Apparently the "beginner" must be given "rigid formulae" and warned against heterodoxy. The result has been extremely annoying to the reviewer, whose daily work with definite psychological variations runs up against prejudice and senseless statements of natural phenomena which, if a "student" should believe, would make it impossible for him to comprehend the behavior of his fellow man.

"Purposive action" is a fundamental of this presentation. "Conscious" or "unconscious" are very badly distinguished in this "purpose." Lamarck's "purpose," elaborated by Samuel Butler, we can somewhat comprehend, especially when Semon's "Mneme" conception is integrated therewith, but McDougall's contortions over the formulation seem to confuse rather than enlighten us. Yet the book is replete with sincere effort and shows considerable acumen as well as a very deep scholarship. It is almost completely human, and this says much for a textbook of psychology, but the author shows throughout a certain faulty assimilation of medical situations which, had they been better emphasized, would have given an ideal text.

Ronge, P. H. OVER DE ZOOGENAAMDE ENDOTHELIOMEN DER DURA MATER. [P. den Boer, Utrecht.]

We would call particular attention to this excellent doctorat thesis in Dutch, stimulated by Winkler, as a careful clinical and pathological study of the so-called endotheliomata of the dura which have been discussed with us by Cushing, whose monograph (1922) has been carefully digested.

Henning, Hans. DER GERUCH. Zweite Auflage. [Johann Ambrosius Barth, Leipzig. 15 mk.]

"In the beginning there was Smell." All of the natural sciences testify to this aphorism upon which the author builds this delightful study of the importance of the olfactory stimulus to preservation of the individual and perpetuation of the race—Schiller's "Hunger und Liebe."

The telencephalization that has taken place in the advancing animal phylum proceeded by way of the rhinencephalon. Edinger, Kappers, Elliott Smith have all shown this and the present volume summarizes much of the evidence.

This is a type of work much needed in contemporary medicine. The half-baked chemical theories concerning the origin of hay fever, asthma, and related phenomena would not be pouring into the medical press if the neurology and psychology of smell were better known to these propagandists of pollen extracts and related hokum. We

commend this volume to our readers. It is a type of sensory analysis which does some justice to the complexities of the biological inheritance of man. In the light of this rich material the average naïve conceptions of human behavior in their reactions to the influence of smell must be entirely remodeled and put upon a broader foundation. The superficialities of the nose and throat specialty speculations and their ridiculous surgical atrocities, founded on abysmal ignorance of smell physiology and psychology, should receive through its study a well-merited check.

Then shall we be spared the childish pictures in our medical journals of the "prickles" on pollen grains, and the hypotheses that these microscopical protuberances produce hay fever, asthma, epilepsy, etc., by reason of their "physical irritation" upon the mucous membranes, deviated septa, etc., and other ad nauseam moronic deductions.

Tocher, J. F. ANTHROPOMETRIC OBSERVATIONS ON SAMPLES OF THE CIVIL POPULATIONS OF ABERDEENSHIRE, BANFFSHIRE AND KINCARDINESHIRE, etc. [Oliver and Boyd, Edinburgh.]

William Ramsay Henderson left a fund for anthropological study of the Scottish people, with especial reference to the problem whether the asylum population corresponded with the anthropological types of the general population. This large octavo study of some 170 pages presents a mass of anthropometric statistics.

The study shows that the psychotic and nonpsychotic are both samples of the same general population. For the anthropologically inclined here is a host of very superior measurements.

Brownlee, John. THE ORIGIN AND DISTRIBUTION OF RACIAL TYPES IN SCOTLAND. [Oliver and Boyd, Edinburgh.]

An interesting anthropological discussion of where the Scots came from and of what races they may be composed. This small brochure only raises the question. It does not solve it. The reader is referred to Tocher's larger monographic study of the material.

Cushny, Arthur R. A TEXTBOOK OF PHARMACOLOGY AND THERAPEUTICS. Eighth Edition. [Lea and Febiger, Philadelphia and New York.]

For the physician interested in the nervous system this pharmacology is almost the only one of its kind that is at all satisfactory. Cushny has, in part, grasped the significance of the vegetative nervous system and its mode of handling stimuli.

We could review at length this excellent work, but it does not need our praise. It stands preëminent and in its new edition maintains the high rank it has always enjoyed.

McKerrow, James Clark. ABERRATIONS OF LIFE. [Longmans, Green & Co., New York and London.]

This little book like the author's *The Appearance of Life* tells in a simple and straightforward manner the meaning of internal and external maladjustments in their effects upon the normal or

usual behavior of man, physical or psychical. It is not very profound although cast in a novel form, yet, withal, readable and thought provoking and a relief from the arid forms of much conventional discussion of the problems frequently presented.

Bouman, L., en Brouwer, B. LEERBOEK DER ZENUWZIEKTEN. Deel 1, 1st Gedeelte. [DeEwen, F. Bohn, Haarlem.]

This is the first half of the first volume of a Textbook of Neurology edited by Prof. L. Bouman and Prof. B. Brouwer with the assistance of Ariëns Kappers, K. H. Bouman, Van Breemen, Van den Broek, Dusser de Barenne, DeKock, Meijers, Nieuwenhuys, Quix, DeVries and Wertheim Salomonsen.

This first volume deals in an exhaustive manner with the embryology, macroscopic anatomy, histology, experimental physiology, and histopathology of the nervous system.

It is a definite product of Dutch neurology and stands as a monument to these workers in this comparatively small country. Van London, then an assistant to Winkler, more than ten years ago conceived of the idea to publish such a definite national work and L. Bouman took up the idea, and the beginning of this idea is now specifically before us in a large octavo volume of 540 pages with 249 illustrations. It is meant for medical students, general practitioners, neurological specialists. This and much more Dr. Brouwer tells us of in his simple straightforward introduction.

The Embryological Development of the Nervous System is written by A. J. P. v. d. Broek as the opening chapter. This, with a general description of the form of the nervous system, is very ably presented in ninety pages. It is a model of accurate and concise description.

A second chapter deals with the Histology of the Nervous System. This is by Ariëns Kappers and is an extremely clear and vigorous presentation. He first describes and illustrates various types of receptor apparatus, then takes up the structure of the neuron and the chaining together of neurons from the peripheral receptor apparatus to the central switching and shunting stations. This leads to a discussion of the principle of neurobiotaxis in determining the morphology of the central organs. The coverings or meningeal organs are first described, then the finer structure of the spinal cord and the oblongata and the special functional morphology rapidly and clearly indicated. Brouwer's scheme of the eye muscle nuclei is utilized.

The cerebellum is then described, followed by the structures of the midbrain and interbrain. The thalamic and striatum complexes follow, and finally the cortical arrangements.

Dusser de Barenne deals in the next chapter with the *General Physiology* of the nervous system and then with its *special physiology*, first of the spinal reflex arcs, and then with general segmental physiology. Special sections deal with the "Autonomic" nervous system, the "Cerebellum," and the "Central Ganglia." Finally the functional localization of the cortex is discussed.

The final chapter in this splendid treatise is written by P. Nieuwen-huyse on the "General Histopathology of the Nervous System."

It is to be regretted that such a valuable collection of clear, compact, and up-to-date treatises should be in so difficult a language. We can only hope that they may shortly be translated.

Kantor, John L. THE TREATMENT OF THE COMMON DISORDERS OF DIGESTION. [C. V. Mosby, St. Louis, Mo. \$4.75.]

The attention of the neuropsychiatrist is directed to this most interesting work primarily because of its summaries of methods of study at the physicochemical level. Here are most ably portrayed what the X-ray eye may see of the inner structural possibilities of gastrointestinal motion. There is little understanding of the relation of the psyche to the soma to all this, but this will come after the superficial structural facts are better assimilated.

Allbutt, T. Clifford. NOTES ON THE COMPOSITION OF SCIENTIFIC PAPERS. [The Macmillan Company, New York and London.]

This is a third edition of this really charming and delightful work which no writer hoping to present his ideas to the medical public can afford not to know. He should possess it as well, for one reading is not sufficient. It is as important for the young medical writer as his dictionary.

Adler, Alfred. THE PRACTICE AND THEORY OF INDIVIDUAL PSYCHOLOGY. Translated by P. Radin. [Harcourt, Brace and Howe, New York.]

When Adler wrote his original study on "Organ Inferiority" he really had an idea. True it was not in any sense a new one. It was at least as old as Aristotle, but he brought to it an entirely new application and a new mode of its identification as its consequences ramified throughout the personality of man and gave rise to behavior, which through the new concept could be the more readily appraised and met with in psychotherapy. His "Neurotic Constitution" was the elaboration of his idea as well as a statement of his platform to which he advances chiefly through the understanding obtained in psychoanalysis.

He still harps upon it, and although he has more and more entered into the field of pedagogy and social psychology, the "inferiority complex" and the "masculine protest" remain for him the goal of his philosophy and therapeutics.

The present collection of essays, of very unequal merit and often quite fragmentary and desultory, iterate and reiterate his older ideas. While there is undoubtedly much excellent descriptive material in Adler's studies, we are far from feeling that he has really gotten at grips with the fundamental models of unconscious motivation. Adler never really comprehended the libido theory and has become a static thinker in terms of quite superficial mechanisms. We find nothing new in these essays, albeit they are of interest in the outlining of the "ego impulse," if one can really assume this to exist apart from the functional force that has brought about evolution.

OBITUARY

DR. JOHN IRVINE HUNTER

Dr. J. I. Hunter, M.D., Ch.M., of Sydney, Australia, died of pneumonia in London, December 11. He was returning to Australia from America, by way of London, and was invited by his former teacher, Professor Elliott Smith, of the University of London, to deliver three lectures at the University College, London, on December 8, 10, and 12, on the subject of the anatomy and physiology of the sympathetic innervation of striated muscles. At the age of twenty-two, Dr. Hunter was made associate professor of anatomy at the University of Sydney, Australia. At the age of twenty-four, he became professor of anatomy, and was the youngest professor of anatomy in the history of that university. At the time of his death, aged twenty-seven, he was Challis professor of anatomy at the University of Sydney, and honorary consulting neurologist to the Lewisham Hospital, Sydney, Australia. His work on "The Influence of the Sympathetic Nervous System in the Genesis of the Rigidity of Striated Muscles in Spastic Paralysis" was widely known through the extensive notice given to it in both lay and medical periodicals. (B. M. J.)

N. B.—All business communications should be made to Journal of Nervous and Mental Disease, 64 West 56th St., New York.

All editorial communications should be made to Dr. Smith Ely Jelliffe, Managing Editor, 64 West 56th St., New York.

The Journal

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ORIGINAL ARTICLES

SOME REFLECTIONS ON MUSCLE TONUS

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PRESIDENT'S ADDRESS, NEW YORK NEUROLOGICAL SOCIETY *

I suppose, for my comfort, that each of my distinguished predecessors, when the moment came for them to rise as I do to-night, to preside over this Society for the first time, felt as I feel—but nowhere can I find that they addressed you in words that adequately expressed that feeling. What they did not succeed in expressing, I shall not attempt to say. Truly, I have no words in which to make acknowledgment of the great honor you have done me.

In your behalf, and as the first duty of my office, I wish to convey to our retiring President our appreciation and gratitude of the signal services he rendered to the Society, during his tenure of office. I am entering upon my duties with the assurance that I can turn to him for counsel and help in any problems that may confront the Society, and without that assurance I would feel, if it were possible, even more concern than I now do for the fate of the Society during my term.

I am also encouraged by the assurance that the inspiration the Society receives from the presence among us of Dr. Dana, Dr. Starr, Dr. Sachs and others whose names are honored wherever neurology is known, will continue. I am too old for the little work I have done, but I am still young enough to feel thrilled when those whom I have always regarded as the Masters of our science in America, come to communicate to us the results of their experience and wisdom, or rise to guide us in our groping on the way to truth.

For many years neurology has been winning its way upwards in

* Read at the meeting held February 3, 1925.

the hierarchy of medical sciences, until now its position is assured, and all pay tribute to it as the science of the executive and administrative and legislative departments of the confederacy of functions that constitute human life. Particular aspects of our constitutional habit interest each of us, and excite us according to our nature and our opportunities to investigate them. Dr. Jelliffe will elucidate for you the impulse that determines your choice of interest, and he will also warn you of the penalties that will confront and complex you, if that impulse should be denied expression. I should like to add to his weighty warnings, my most earnest request that you give free vent to that expression here. The psychic health of this Society depends upon that free expression, in written or in spoken speech. The Society expects and will appreciate a communication from every one of its Fellows, and in favoring us with their communications the Fellows will find that their complexes will cease from troubling, and their motor equivalents will find rest.

My nature and opportunities have been such that I have found myself intrigued mainly by motor equivalents. I happened to be placed near the center of the epidemics of lethargic encephalitis in this country, and was in consequence led to study the motor manifestations of this disease as I saw them, and to report the results to you. This, in turn, caused me to be curious about the motor mechanism, and at various times I have submitted for your valued criticism, deductions and inferences as to the nature of muscular action, which clinical study of this epidemic disease seemed to justify. To-night, I should like briefly to summarize, what we think we know, of some common motor actions and their causes, in the hope that certain among you may be led to concern yourselves to check up the work already done, to correct it where it is at fault, and by your observations to carry it forward from the point of abstract scientific interest where it now halts, to the point where it may become available for relieving the suffering it causes those in whom we have the occasion to study it.

The function of mobility of the body and of its several parts is carried out by an organ which we call the musculature, and which is composed of an infinite number of muscular units, grouped to initiate, to reinforce, to maintain, to balance, to stop, or to reverse such changes in our skeletal attitude, as we consciously desire, or emotionally suffer. A vast and complex nervous mechanism controls the musculature, and produces in it the phasic changes which tend to voluntary movement. These changes are caused by chemical action in the muscle cells, that give rise to increase or lowering of what we call muscle tone. As evidence of the chemical changes, we have reports of

careful workers on the metabolism of active and of resting muscles. Such chemical changes are accompanied by electrical changes of measurable direction and extent; and also by other physical changes, among which we for the moment are chiefly concerned with the elastic state of contraction, or tone of the examined muscles.

If we consider the arm hanging quietly by the side, we may without serious fault regard the tone of the flexors of the elbow in that position to be on a par with the tone of the extensors. The arm hangs quietly, the flexors do not dominate over the tone of their antagonists the extensors, and no movement results. If the flexor tone does dominate, the arm bends upwards. The flexors shorten, the extensors stretch, and as the movement progresses, through a series of intermediate postures to the desired posture, to every new posture there pertains a definite enhancement of muscle tone in the flexors and a definite diminution of muscle tone in the extensors.

Throughout the movement, this enhancement of tone in the flexors takes place at a definite rate. And each serial posture must be maintained until that of its successor in the movement can be superimposed, to produce the smooth, thrifty, direct character that denotes normal movement.

Normally the tone changes follow one another at a rate of about 20 per second, and each change at that rate is ample in extent and in duration to fulfill its desired end. We have not yet attained much exactness in determining the amplitude of the individual changes. The amount of the successive changes of tone may vary rhythmically or arrhythmically.

The duration of the individual changes may vary too, and so may the rate at which they follow one another either with or without variation in the extent or duration of the individual changes. We have therefore at least three variables to consider in the changes of tone in the flexor muscles, namely, the extent or intensity of each change of tone, its *duration*, and the *rate* at which the changes occur.

And these three variables which we distinguish in the enhancement of the tone of the flexors we can likewise distinguish in the synchronous diminution of tone in the extensors. And when we are confronted with a defect in voluntary movement we try to determine by analysis of the defect, just where the fault lies among these variables.

Boers attributes the tremor of old age mainly to hypotonia, to the inadequacy of the intensity of the successive changes in tone, the inadequacy both of the enhancement of the tone of the agonists, and the inadequacy also of the diminution of tone in the antagonists. It

seems unlikely that other things being equal, such inadequacy would create much disorder in movement. Rather should it show itself in delay and limitation and weakness of the movement. Von Monakow regards the tremor of Parkinson's disease as partly due to hypotonia, but partly also to a falling off in the rate of succession of the changes in tone. He observed that the rate in Parkinson's disease fell from 20 to 16 per second, and inferred that between the changes the muscles had time to relax in part, which gave the movement an uncertain and oscillatory character. If the hypotonia and the falling off in the rate of change be equal in both the agonists and in the antagonists, it would seem, *a priori*, as if the movement would be less disorderly than if these faults affected one group to a greater degree than the other. And the greatest likelihood of disturbance seems to lie not in lack of intensity, or even in diminution of frequency, but in lack of correspondence between the duration of the enhancement of tone in the agonists and of the reduction of tone in the antagonists.

Our studies so far have been mainly concerned with the tone enhancement changes. We do not as yet know much about the complementary reduction of tone in the antagonists. But if, as I am inclined to think, the enhancement of tone in a muscle is normally in part a liberation of energy due to the cessation of prevailing inhibitory reflex nervous action, and diminution of tone in the antagonists is due to an increased activity of such inhibitory action, we shall find the key to many of these problems of disorderly movement not in a study of the more or less passively contracting agonist, but in the study of the active inhibition of tone that is simultaneously induced in the antagonists.

The prevailing tone of muscles, the tone, so to speak, of each particular muscle locality is maintained in part at least by the sarcoplasmatic portion of voluntary muscle. The sarcoplasmatic portion of voluntary muscle is distinguished from the fibrillar portion by histologic structure, chemical composition, electrical reaction, function, and nerve supply. The nerve supply is derived from neurons which originate in cells in the lateral horn of the spinal cord and their analogues in the cerebral end of the nerve axis. It is noteworthy that adrenalin which produces fine tremors in normal individuals, and emotion, exertion, or excitement, which stimulate adrenalin secretion and also induce tremulousness, all aggravate the tremor of Parkinson's disease, a positive result which may be attributable to stimulation of the active inhibition of tone in the antagonist groups, whose nerve supply is closely related to the sympathetic system of nerves that adrenalin excites.

Upon these prevailing local tone changes which I am suggesting, are established at this neurochemical level, the voluntary phasic changes of the musculature as a whole which are superimposed, and correlated by reflex nervous action, of such complexity that I think I may easier make the matter clear if I now turn from the elastic state of the contracting voluntary muscles to the mechanism by which the influence of the will is brought to bear on them.

The desire that evokes a movement calls forth as one of its essential attributes a series of postural images, linking the desired with the existing posture. Each postural image has a certain intensity with which it demands motor expression and which leads it to dominate over the existing postural images so that it effectively prevails. These postural images leave the conceptual sphere, and pass in regular order, with a given urgency into a prepyramidal region of basal nuclei and associated structions where they lose their conceptual character, and become converted into nerve impulses which ultimately pass to the cells of the Rolandic area. In their passage these impulses are finally analyzed and distributed along specific neurons according to the ultimate destination of the impulses they carry. In other words, even in the prepyramidal region, there is definite functional localization. And when irritative lesions affect these prepyramidal neurons we see the spontaneous muscle twitchings of myoclonus, or in degenerative lesions, dystonia.

The intensity, rate, and frequency of the postural images that excite the prepyramidal structures, we have no means of estimating. But the movements which express each of these successive postural images, receive in this region their tone qualities. It is here the movement acquires its readiness, its strength, its rhythm, and its integration with the existing state of the musculature. And here again the enhancement of tone is normally in part a liberation of energy due to the cessation of the generally prevailing inhibition of reflex and automatic and emotional nervous action, and the complementary diminution of tone in the muscles that oppose the muscular expression is due to an increased action of the prevailing inhibitory influences.

From the prepyramidal region the impulses pass in ordered sequence to the cells of the Rolandic area where at regular intervals they are discharged through the pyramidal tract to the anterior horn cell, and thence by the lower motor neuron to the voluntary muscle.

In the conceptual sphere, variations in the intensity, rate and frequency of the excited postural images, can produce chaos in movement, but every movement expresses a purposeful posture and not an

isolated muscular act. It is chiefly in this sphere that the choreiform movements originate.

Every willed movement has a definite aim: it fulfills to the satisfaction of the critique, the desire which evoked the movement. That desire called forth as one of its essential attributes, a series of central after-images of the postures linking the desired with the existing posture. And every component posture of the willed movement, as the movement was performed, excited a peripheral after-image of the moving part. These postural images that were initiated by the desire, and those that were excited peripherally by its performance, neutralize one another perfectly, satisfy the critique, and the desired aim being achieved, the musculature comes to rest or proceeds to express desires anew.

In chorea the neutralization does not occur; the central motor images remain undischarged and capable of exciting further muscular movement. The peripheral after-image of the choreiform movement has also the power to excite change, as it induces a desire to correct its motor consequences. Further movements ensue, and each posture achieved contributes further to disturb the postural associations till they become a whirl of futility and confusion. So fatigue comes, and adds to the postural instability. And the reproduced postures succeed one another in increasingly chaotic sequence and with uncalled for violence. The movements no longer express conscious desire, but are expressive merely of the dominant postural images, that emerge from the emotional, volitional, and peripheral excitations that are rioting through the sphere of the postural associations, exciting one muscular posture after another. And as these are not harmonized with their predecessors, but merely supplant them, they lack tone, for they possess only the surplus tone of their dominance.

A still greater tone lack is observable in the usual affections of the prepyramidal system, but here we see defects arise in the several qualities of tone, affections of the readiness, strength, rhythm, and duration of the movement. There may be the myoclonus or dystonia we have already mentioned, but these I think occur as the result of affections near the end of the prepyramidal system, where it is converging upon the Rolandic area. Usually we see a more diffuse increase or lack of muscle tone; there may be a mild paresis; or delayed initiation and retarded execution of movement; or diminished volume and extent of the movement, or easy fatigability; or loss of physiologically associated movements; or lack of affective movement; and these changes result in alterations in station and in gait, disturbances

in the higher automatic coördinations such as walking, chewing, swallowing, and speaking *adiadochokinesis*; and propulsive movements.

And when we come to the lesions of the pyramidal tract itself, we find the phasic variation of tone more or less abolished, together with all the attributes of plasticity that cerebral inhibition of tone confers. There is loss of movement, increased resistance to passive movements, rigidity with clonuses and exaggerated deep reflexes, with the return of the primitive skin reflexes such as the Babinski. If some movement survives, the pull of the antagonist sets in earlier and persists longer, so that its recoil effect is premature and excessive.

The rigid muscles assume fixed attitudes which reflect mainly the primitive dominance of the local flexor tone over the extensor tone. The force of gravity is too feeble to modify those fixed attitudes, but sleep usually relaxes them.

And if the affected members are not rendered immobile unsupported they display a coarse tremor, affect the extremities more than the head, the forearm and wrist more than the hand, the leg and ankle more than the toes. It is coarser, and more irregular than the typical Parkinsonian tremor. This tremor reaches its height when the rigidity scarcely suffices to limit the range of movement. It is always preceded by rigidity, and disappears when the rigidity suffices to immobilize.

The three tone variables, the extent or intensity, the duration, and the frequency of the enhancement or diminution of the elastic state of contraction in muscle, we have considered at the lowest or neurochemical level; and we have briefly sketched the course of the alterations in these variables from the psychic level. Throughout, I think, the plastic changes in the musculature arise from a liberation of energy due to cessation of preëxisting nervous inhibition of tone when the tone is enhanced, and to a conservation of energy due to increase of preëxisting nervous inhibition when the tone is diminished. The prevailing local tone of any muscular area is a vegetative function. The prevailing general tone of the whole musculature is largely determined by the mental state, by the existing affective condition, of which the desired posture is merely one muscular expression. We have been slow to realize the vegetative quality of the muscular organ, and we have been still more reluctant to consider movement as an emotional expression. I have therefore ventured to give this brief sketch of motor actions and reactions, in the hope that your observations will fill in the obvious gaps in our knowledge of muscular action, and will clear up what is still mysterious about the wondrous ways in which men move in health and in disease.

THE PRESENT STATUS OF THE MALARIAL INOCULATION TREATMENT FOR GENERAL PARESIS*

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Initiating one of the most striking empirical additions to our knowledge of the treatment of disease, the announcements of the experiments of Wagner v. Jauregg (1, 2, 3) in 1918, 1921, and 1922 reported certain successes in producing long remissions in paretic neurosyphilis. Concerning the tendency of paretics to temporarily improve following intercurrent infectious diseases and suppurative processes, he had made observations as far back as 1887, which suggested the advisability of deliberately attacking the problem with a controllable fever-inducing element. In the earlier attempts tuberculin and mercury were used with encouraging results, later typhus vaccine was tried and found to yield somewhat better or more lasting results than tuberculin, but all this inspired the hope that an acute infectious fever might prove more effective, so the tertian type of malaria, since it may be definitely controlled, was selected for the purpose.

In 1917 Wagner v. Jauregg treated nine cases of paresis by this method—six of the nine were favorably influenced and in 1922 (four years after treatment) three of these were still actively and efficiently at work. This result stimulated the investigator to use the method continuously, and it was subsequently reported that over two hundred cases had been treated with the result that more than fifty were in complete remissions, which included cases not only of beginning dementia but also states of severe maniacal excitement with delusions of grandeur and delirious reactions.

Improvement often continues to progress for a long period after treatment has been terminated with the result that physical and mental health are restored, potency is reestablished and the disturbance of speech and epileptiform attacks, clear up.

Naturally other European investigators were not slow to follow this lead of Wagner v. Jauregg, so at present there is a bibliography of some forty numbers dealing with different aspects of the question.

* Read before the Baltimore Medical Society, December 5, 1924, in Baltimore, Md.

Among the earlier favorable reports were those of Delgado (4) of Peru, of Nonne (5) of Hamburg, Pilcz (6) and Gerstmann of Vienna, whose comments will be discussed later on. In England McAlister (7), Grant (8) and Purves-Stewart (9) are among those who made early contributions to the subject.

The results obtained abroad were so encouraging that the superintendent of St. Elizabeths Hospital advised his staff to organize a similar experiment, which was started more than a year ago, and reported in part by me at the June, 1924, meeting of the American Psychiatric Association, at which time emphasis was laid on the pathologic alterations in the brain tissues of the few fatal cases.

Sixty-eight patients in whom paretic neurosyphilis had been diagnosed with certainty were selected after permission had been obtained from the nearest relatives. The selections were made by a board of four psychiatrists, members of the hospital staff, who classified these patients according to their condition into A, B, and C groups (Table 1). The A group was composed of those who were in fair condition mentally and physically, those in whom the diagnosis might be in question in the absence of typical serology, the B group were those who showed some deterioration and were more or less rapidly progressing, while the C group was composed of advanced cases appearing entirely hopeless from a therapeutic standpoint.*

These patients were inoculated intramuscularly according to the Wagner v. Jauregg technic with from one to two c.c. of blood from acutely malarial (benign tertian type) nonsyphilitic individuals. Chills occurred after 8-10 days' incubation, and were generally allowed to continue from twelve to sixteen paroxysms, which were then interrupted by active quinine therapy. Of the sixty-eight patients selected, nine failed to develop the malaria after repeated inoculations, and eight of those who did respond were unfortunately early transferred from the hospital, after which no adequate information was available, thus leaving fifty-one cases to be examined and considered from the standpoint of results by the same board of physicians.

Sixteen patients developed a "complete remission" or arrest in symptoms with restitution to the extent that they were discharged from the hospital or considered fit for discharge. In nineteen others the disease was merely arrested, and has so remained. Twelve progressed to extreme deterioration, that is to say, were not benefited,

* A paper by Dr. Watson Eldredge *et al*, detailing their clinical study, has been sent to the publishers.

and thirteen died either during or shortly after the treatment, from intercurrent diseases.

It is perhaps now advisable to make some qualifications, and to discuss further the several issues of interest including the results, comments and speculations of those interested in this type of therapy.

1. It must be emphasized in the selection of cases that general paresis be diagnosed and differentiated with certainty by at least two of the three objectives (mental, physical and serological) one of which must be the serological picture—since it is at least theoretically dangerous to add the cerebral pathology of malaria to that of the vascular type of neurosyphilis.

2. Reese and Peter (10) advise against attempting to treat the late, weak and decrepit patients since syphilitic aortitis is present in so many of the late cases. They state that 81 per cent of late cases show syphilitic aortitis, which percentage is considerably higher than we have found at St. Elizabeths during the past six years, and moreover some of our most notable remissions have occurred in those cases, apparently quite advanced in the disease, thus not originally considered to be at all hopeful.

3. Since the procedure is not without some danger, which will be emphasized later, a written permission for this treatment should be obtained from the nearest relatives after the precise nature of the disease, its prognosis and the treatment have been thoroughly explained to them.

4. Before inoculation it is well to determine the absence of quinine idiosyncrasy.

5. If for some reason the malarial blood is not injected immediately after its withdrawal from the subject it should be kept at 37° C. and not shaken lest the plasmodia perish.

6. Direct intravenous injection of about two c.c. is preferred by many workers: we have used only the intramuscular route—there is no systemic reaction in either case. The donor of the malarial blood should be given a careful study of the clinical blood picture in order to exclude the malignant estivo-autumnal form of parasite. We have also insisted that the donor have a negative Wassermann, although I understand that the European workers are not so particular in this respect, but sometimes transfer from one parietic to another.

7. There are many interesting points concerning the behavior of the induced malaria and perhaps the best general account dealing with this phase of the question is that of Yorke and Macfie (11), who have discussed among other topics: *a*, the nature of infections produced by inoculations of different varieties of malaria organisms; *b*, the

infection produced by mosquitoes; *c*, the mechanism by which cure is obtained in malaria; *d*, the unicity hypothesis of malaria parasites; *e*, the effect of numerous direct passages of plasmodium vivax through man, and *f*, the susceptibility of induced malaria to treatment.

Regarding the last clause, the observations of previous writers that general paretics who had been infected with malaria by inoculation were readily cured by short courses of quinine treatment or quinine and salvarsan combined, were confirmed by these authors. On contrasting the results of treatment of inoculated cases with those obtained in the treatment of simple tertian malaria during the war or in ordinary practice one is impressed by the marked difference especially in the percentage of relapses. They dismiss this observation with the following comment: "Various hypotheses have been advanced to explain the remarkable sensitiveness of the inoculation strain to quinine treatment. It appears to us that the true explanation of the success in the treatment of these induced infections is to be sought in the fact that we are here concerned with the early treatment of disease or in other words with the treatment of primary infections and not, as in the war or as frequently in private practice, with old standing relapse cases".

TABLE I
RESULTS OF MALARIAL INOCULATION THERAPY

Result	No. Cases	Condition at Start			Paroxysms		
		A	B	C	Severe	Mild	None
Complete remissions..	16	2	9	5	16	0	0
No change.....	19	3	14	2	16	0	3
Deteriorated.....	12	1	8	3	7	3	2
Died.....	13	1	6	6	7	2	4
No information.....	8						

8. Many paretic patients fail to develop malaria after repeated inoculations. This was true in 5 per cent of the Reese and Peter group, in over 13 per cent of our St. Elizabeths group, and as high as 66 2/3 per cent in the small tropical group of Van Loon and Kirschner (12). These authors inoculated twelve paretic patients with malarial parasites, four with the malignant and eight with the benign tertian type. Eight of the twelve patients were refractory to the malaria and had lived their entire lives in the tropics. One case of early general paresis treated with the benign form was greatly improved, and one treated with the malignant type was seriously ill for a month; however, when the malaria was finally cured the paresis was improved to the extent of complete restoration of earning capacity of the individual.

It seems that the natives of the tropics are predisposed to skin

ulcerations, and that here syphilis displays a predilection for the skin. Since the skin apparently plays an important rôle in the production of antibodies, this may serve as a tentative explanation of the refractory behavior to malarial inoculation. The course of the syphilis may also be influenced by some of the recurring febrile tropical diseases.

9. Occasionally a deteriorated patient dies during the course of malaria, usually with bronchopneumonia, convulsions or cardiac decompensations. The appearance of icterus, cardiac stress, hemorrhagic cystopyelitis or active convulsions indicate immediate interruption of the malaria, however, it is not unusual or is it an untoward symptom should the patient under treatment develop motor restlessness, or to express any variety of new mental reactions, but more particularly paranoid ideas. Of the eighty-four patients constituting the Yorke and Macfie group, fourteen died immediately or shortly after the completion of the course of malaria treatment. Although all of these patients had been treated with quinine and the parasites had disappeared from the blood, the authors found it "impossible to affirm that in none of them was death accelerated by the malaria." Of a different opinion are Reese and Peter (10), who lost by death twenty-five or one-third of their seventy-five cases. Of these cases only seven were supposed to have been due to the malaria, while eighteen died of intercurrent and complicating conditions, in which the authors were able to maintain that the terminal issue bore no relationship to the induced infection. I am inclined to believe that malaria has probably hastened the majority of these deaths since this percentage of deaths is too high to represent ordinary conditions.

In our own group of fifty-one patients, thirteen died. Most of them from pneumonic complications or other intercurrent diseases soon after active treatment was terminated. Autopsies were made on four of these cadavers, and I have described elsewhere (13) in detail the neuro- and general pathologic findings which the following statement summarizes. "While the cases studied microscopically obviously represent the failures, they serve to emphasize the necessity of treating the cases as early as possible in the disease before permanent damage has been done to the brain structures. This permanent change is indicated among other signs by the atrophied, sclerotic, disordered cortical architecture, the disintegration of neuron cells, dense neurogliosis, and in adventitial reactions; however, there are indications that some types of treatment, including the malarial, tend to reduce the exudate, since in these brains there was apparent reduction in the plasma cell and lymphocyte infiltration of both

meninges and perivascular spaces; certainly these brains exhibited far less exudate at termination than the average parietic.

"There was a marked tendency to capillary hemorrhages and thromboses through the brains of those who died early in the experiment. This reaction in the newly formed capillaries of parietic brains may account for the untoward results and production of neurologic symptoms which may be transitory as reported by some of the European workers, who have used the malarial treatment."

In two of these brains spirochetes were not found, but in the other two a few were demonstrated. It is obvious that any permanent remission or "cure" in paresis must depend upon the total destruction of spirochetes in the brain tissues. According to the Wagner v. Jauregg clinic, the histological changes in cases dying in remission after malarial treatment resembled the "stationary paralysis of Alzheimer" with almost complete absence of the usually found progressive picture.

According to Gerstmann's (14) report, the importance of an anatomical control of clinical remissions is obvious, and he quotes the histological findings in three cases which had shown complete remissions, the patients dying later of intercurrent diseases. The pathologic changes were so poorly developed compared with the classical findings that without previous knowledge of the cases there would have been some difficulty in making the anatomical diagnosis. He also mentioned the greater infiltration of the temporal lobes with exudate as compared with other cortical areas and suggested a possible connection between this fact and the frequent occurrence and persistence of auditory hallucinations.

10. Concerning the treatment of the malaria, perhaps the Mühlen's scheme has given the best results. Five-tenths gm. of quinine hydrochlorid is given orally twice daily for a week, then a week of quinine-free days is passed, after which are instituted alternate periods of three days treatment with one gram per day and six-day quinine-free intervals, until about fifteen grams have been taken. This is a long but sure method; however, if in certain cases immediate cessation of paroxysms is desired an intravenous or intramuscular (1 gm.) injection of quinine urethane may be used. Recurrences are not frequent.

Before dismissing this aspect of the subject it should be mentioned that evidence has been offered by Barzilai-Vivaldi and Klauders (15) to the effect that inoculation malaria is not transmissible by anopheles. The observation that sexual forms (gametes) were almost entirely absent from the blood of inoculated patients

was the starting point of several experiments. They exposed inoculated malarial patients to anopheles bites and attempted to transmit the disease to others in this manner. The results were negative, although the susceptibility of these subjects was demonstrated through subsequent injection of malarial blood. From such experiments the authors concluded that the malaria treatment of paresis entails no danger of spreading the malaria by this means.

11. We should now comment more extensively upon the results obtained by this treatment before discussing some of the theories regarding its supposed mode of action. Yorke and Macfie (11) have summed up their results in this statement: "Up to the time of writing a sufficient period has elapsed to enable a judgment to be formed regarding the effect of malaria treatment in respect of eighty-four patients suffering from general paresis. In presenting these results we have relied on the judgment of the medical officers in charge of the patients at the various mental hospitals." "No noticeable change in mental or physical condition has been observed in twenty. With regard to these cases, however, it is to be borne in mind that in the ordinary course of events many of them would now be dead. In ten there is definite physical improvement, but no change in the mental condition. In seventeen there is great physical and distinct mental improvement. Finally, in twenty-three, the mental and physical improvement has been so great that the patients have been or are about to be discharged from the mental hospitals." I have mentioned earlier in another connection that fourteen of these eighty-four cases died immediately or shortly after treatment. "In a number of the cases the improvement has been maintained for many months—in some for as long as a year—and quite a number are back at their old occupations. As time goes on it may be found possible to discharge still others of these eighty-four cases. As Wagner v. Jauregg writes: 'The maximum of the improvement does not manifest itself at once at the end of the period of fever, but does later. On the contrary, the improvement continues often for a long period so that in many cases the result seemed to be an incomplete one where later, however, a complete remission came to pass.' Whether the improvement is temporary or permanent only time can decide, but the results already achieved can only be regarded as remarkable when it is realized that no patient suffering from general paresis had previously been discharged from the mental hospitals in question."

The results of Reese and Peter (10) are of particular interest since they represent this work as carried on in Nonne's clinic in Hamburg, beginning in June, 1920, in the application of the treat-

ment to 270 paretics, and covering a period of about two years. They present statistics on seventy-five cases of their series which they divide into three groups.

In group I thirty-eight (50 per cent) patients show definite remissions with ability to carry on their profession or work—a few residua of the disease remain. In group II fifteen (20 per cent) may be regarded as practically cured—are considered healthy and only minutest anomalies remain. In group III twenty-two (29 per cent) were not influenced by the treatment. Three of these were cases of juvenile paresis.

Twenty-five (10.6 per cent) of their whole series died of various intercurrent and complicating diseases. In their experience the best remissions were noted in the manic-agitated types and the worst prognosis found in the demented forms. This high percentage of remissions is certainly in great excess over those occurring spontaneously. Spontaneous remissions occur, according to different authors, in 16.8 per cent, 10 per cent and 5.6 per cent (Hoppe, Gaupp, Kirschbaum).

MacBride and Templeton (16) treated sixteen cases: eleven early and five advanced cases. Of the five advanced cases one died during the fever and four showed some degree of mental and physical improvement; however, one of these relapsed later. Of the eleven early cases, two died of the fever, three showed marked mental and physical improvement, three showed considerable physical improvement only, one slight improvement, one became worse, and one showed slight mental improvement but became worse physically and died four months later. In addition they treated two cases of juvenile paresis, but no improvement was noted, which agrees with the experience of others (17). They conclude thus: "Excluding the two congenital cases of a series of 16 cases, three only showed an improvement in any way comparable to the numerous 'cures' of the continental observers. Considering, however, that improvement is said to be progressive, it is hardly fair to conclude that the cases slightly improved may not ultimately show a complete remission. We are of the opinion that the continental workers are unduly optimistic, but only a widespread trial of the method over a long period and in a large series of cases will enable us to confirm or confute their finding. Particularly must the treatment be employed in the early stages of the disease."

Merzbacher's (18) experience with 15 cases has convinced him that malaria has a profound influence on the course of general paresis. Four of these cases showing the most pronounced benefit had long

been treated by the usual antisyphilitic measures without result. He obtained 50 per cent remissions in this small group of patients. Scherber and Albrecht (19) use malarial treatment to advantage in those patients who show only the serology without other clinical symptoms and emphasize the good results of this treatment in paresis and tabes (with pains and affections of the optic and auditory nerves) when followed by additional specific treatment. However, Reese and Peter used some mercury following their treatment, but avoided the use of arsphenamin, which they thought to have an unfavorable influence during the psychic convalescence, and Gerstmann (14) does not consider that subsequent treatment with salvarsan is at all essential, in fact it has been repeatedly neglected for various reasons without disadvantage. This author considers the results to depend essentially on the stage of the disease, the earlier the more certain the remission. In these early cases Wagner v. Jauregg claims that entire success can be predicted with almost absolute certainty. Gerstmann believes the types giving the best results are simple dementia and taboparesis. Pilcz (20) would add the cases of maniacal excitement. The development of acute mental symptoms during the febrile stage is regarded as favorable though they occasionally persist after the cessation of the fever. This is particularly true of auditory hallucinations which may continue in spite of an otherwise complete remission.

12. The following spinal fluid and blood changes mentioned by Reese and Peter are confirmed by others:

(a) Prognostic deductions are impossible from spinal fluid examinations.

(b) There is no parallelism between improvement and spinal fluid findings.

(c) Generally an influence on the albumin and cell count is noted.

(d) In some cases the fluid and blood Wassermann become negative (10 per cent). In several these become definitely altered. Thus a disappearance of serological reactions can occur.

(e) Many cases show no spinal fluid change, although otherwise in excellent remission.

13. Other striking objective improvements are:

(a) Restoration of ability to work.

(b) Complete insight and restoration of judgment.

(c) Pupils of the eyes usually improve, but rarely show complete restoration of the light reflex. It was noted in eight instances in the Reese and Peter group.

(d) Severe speech and writing disturbances clear up.

(e) A marked recession of pyramidal tract disorders.

14. The following comments may be offered as representing attempts to explain the manner in which the malaria exerts this beneficial result:

(a) There can be no specific reaction, otherwise several other infectious diseases and fevers would not produce a similar response.

(b) Since good remissions are frequently found in cases having only slight rises in temperature, the fever alone is not responsible for the result. Early in our experiments at St. Elizabeths we harbored the impression that the repeated high temperature episodes with normal intervals might be the instrument destructive to the spirochete, whereas a continued temperature might allow for a greater degree of adjustment on the part of the organism.

(c) Notwithstanding all theoretical explanations are as yet unsatisfactory, the concept of Mueller should be seriously considered. He believes that changes in vascular tonus occur in various parts of the body following the injections—that parasympathetic reactions such as vasodilatation occur, thus leading to local hyperemia and transudation, which reactions are accompanied by invasions of polymorphonuclear leucocytes and escape of serum. Thus the general leucocyte count of the circulation is lowered and the blood pressure falls. This general leucopenia in the peripheral stream indicates a shunting of current and cells into the abdominal vessels which are dilated by parasympathetic impulses; while the abdominal vasodilation is easily and quickly neutralized by the unimpaired vasoconstrictors, the same dilatation in the local inflammatory areas in the brain is of longer standing and leads to the above described reactions. This suggests an effect on the vegetative vasomotor system independent of temperature rises yet dependent upon malaria. Some believe that we should take advantage of this increased transudate process by following up with the usual specific therapy in order that a more intimate contact with spirochetes may be made.

There has arisen some discussion as to whether parenchymatous neurosyphilis is more infrequent in countries where malaria is a universal disease or state of being. As yet sufficient evidence has not accumulated to decide the question either way; however, Schwartz (21) has reported a case of typical progressive paralysis developing in the fifth year after the patient had had ten attacks of malaria. This patient had acquired syphilis fifteen years before the onset of the paresis, but after all such observations do not particu-

larly illuminate the subject since the experiments of nature differ in many respects from the one attempted by man.

After summing up all of the above evidence one must admit that the results are strikingly better than those gained by any other method yet applied in the treatment of parenchymatous neurosyphilis. The experimental work has not been under way for a sufficient length of time to determine the degree of permanency or the exact nature of the arrest in the progress of the disease. The most prolonged effect reported to date is that mentioned by Gerstmann (22). The first three cases of remission in paresis so treated have maintained their remission status for nearly six and one-half years.

It will be some time yet before a group of malaria treated patients are available to compare with the recently reported group of Thompson's (23) which were reconsidered six or more years after active treatment by the Ogilvie, Swift-Ellis, Wiles and Byrnes methods. Of fifty-three neurosyphilitics, fifteen were paretics or taboparetics, and at the time of reconsideration all were dead save one progressive parietic.

In conclusion it may be said that the reported results of this treatment have been unusually concordant concerning the percentages of improvement or remission, which results justify a conscientious investigation of the phenomena produced.

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A STUDY OF MEMORY DETERIORATION IN ENCEPHALITIS LETHARGICA

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This study was made with the purpose of finding if there is any appreciable deterioration in patients suffering from residuals of encephalitis lethargica.

The writer has been able to find practically no written discussions on this subject. Although cases are now being intensively studied in many hospitals and by many physicians, the disease has been known too short a time, too few autopsies have been made, and too many varying symptoms and after effects observed for us to expect to find any great number of generalizations relative to it.

Very few of those who have written summaries of their observations and their work with cases of post-encephalitis make any mention of disturbances on the mental side. They speak of the lesions in the brain principally in the frontal lobe, though not confined to this area of the brain. Dr. Karl Menninger of Topeka, Kansas, however, mentions cases where "the memory is badly confused."¹ Also Dr. W. A. Fankboner of Marion, Indiana, in a report of nineteen cases of ex-service men in the Marion National Sanatorium speaks of two cases as being "mentally dull."² In some of the clinics which the writer has attended the physicians have spoken of the patients being "mentally clear but hesitating and slow in their thinking." Some of the physicians seem to think that there is memory deterioration, others, that there is none at all. This admits the possibility of either alternative being true, and it was with the purpose of trying to discover evidence for or against, that this study was undertaken.

The method employed was the application of a memory test or set of tests to patients suffering from the residuals of encephalitis lethargica in order to learn from the results whether there is any apparent deterioration of memory, and if so, whether there is greater deterioration in some of the memory processes than in others; also

¹ "Epidemic Encephalitis—A Summary of the Present Knowledge," *Journal of Kansas Medical Society*, Vol. 22, May, 1922, pp. 139-146.

² W. A. Fankboner—"Epidemic of Encephalitis—After Effects," *Journal of Indiana State Medical Association*, Vol. 15, Nov., 1922.

to find whether the duration of the illness seems to be an influencing factor.

For this study the writer used the special memory test for psychotics recently devised by Dr. F. L. Wells of Boston Psychopathic Hospital.³

This is a composite memory test consisting of twenty-six tests which Dr. Wells and Miss Martin have arranged in twelve groups; memory for personal knowledge, for current events, for school knowledge, for repeating digits forward and backward, for counting backward from twenty to one, for repeating the alphabet, memory tests of paired associates, a substitution test, a recognition test, and a test naming objects. Each test is graded by a point scale, time being a factor in all of the tests except four, that of repeating sentences, those of giving digits forward and backward, and the recognition test in which twelve pictures are shown the examinee and then, together with twelve others, shown again and the examinee asked to recognize those pictures first presented. A point scale is used in grading and then the total score can be changed into a memory quotient according to a table based on a norm of one hundred and twenty-seven points. Norms are also given for each group of tests so that it is possible to get the deviation from the norm of each patient in each of the tests.

This memory test was given to twenty-one patients suffering from the residuals of encephalitis lethargica. Seventeen of the number were men, while four were young women. The majority of these cases were between the ages of twenty and thirty-four. It would have been much more satisfactory to have had an intelligence quotient for these patients, but intelligence tests had been made in only a few of the cases, and in those, several years after the disease had attacked the patients. Thus in order to make any comparison between the patients and to interpret the results of the memory tests in the light of the approximate native intelligence of each patient, the school progress and facts about the economic life were studied. Also the course of the illness was studied; the onset of the disease, its history, duration, and after effects, for the purpose of discovering whether those patients suffering from the residuals of the disease for a longer period of time showed a greater loss of memory. Through the courtesy of the physicians in the hospitals where these tests were made, the writer had access to the social and medical

³ "A Method of Memory Examination Suitable for Psychotic Cases." *American Journal of Psychiatry*, Vol. III, No. 2, 1923.

records, and so was able to secure detailed information regarding the life and illness of each patient.

Before proceeding to a discussion of the tests and their results, a few words should be said about the attitude and the responses of the patients. All with the exception of one, gave excellent coöperation and were much interested in the tests. According to the conduct rating scale given by Dr. Wells and Miss Martin, all the patients which the writer tested except two, rated B, or normal in willingness. One of the exceptions who rated C seemed to respond as to a disagreeable task, while the other who rated A, appeared eager for the experiment. In effort, all except two, rated B, or normal effort. One of the exceptions who rated C showed apathy; the other rated A, or utmost effort capable. In physical activity all except one rated D, *e.g.*, acting only as the examination demanded. The exception rated B, *e.g.*, above normal and fidgeting. In speech seventeen rated D, *e.g.*, speaking spontaneously; three rated C, or normal and conversational; one A, or talkative with tendency to interrupt the conversation. There were a few complaints of fatigue. One patient, Patient L, complained of "mental fatigue" in the test in which the states must be given for the unfamiliar towns; yet this patient made the highest score in this test of any of those tested, a score of thirty-seven out of a maximum score of forty. Patient A also complained of "difficulty of remembering" in this test, yet he made a score of 3.5 points above the current norm. Patient K and Patient I complained of muscular fatigue in the substitution test. However, as the entire twenty-six tests took only about twenty minutes, fatigue did not seem to be an obstacle. Most of the patients were confined to their beds, but as the tests were easily given, this was no hardship. Because of the inability on the part of nine of the patients to use their hands, the substitution test, in which writing was required, was omitted with those patients. For these reasons a total score and memory quotient could be secured for only twelve patients.

One general characteristic of all the patients was their slowness of movement and response. While they seemed to be alert and to comprehend the test with ordinary intelligence, their responses were slow. This point will be taken up again in the conclusion of this study.

Tables 1 and 2 show the scores made in each test by each patient. It will be noted that in each test except one, the average is below the norm. The one exception is the test of giving sentences, and here the average is .02 above the norm. The reason which the writer

gives for this is that no time limit is set in this test, and as there is a general tendency toward slowness of response, one would expect the best score where time is not an element of the test. Also it may have been that the sentences were not graded in difficulty, though they were so graded in length.

In studying the average scores and the deviations from the norms, the writer noticed there seemed to be two groupings of the tests—

TABLE 1—SCORES IN TESTS

Patient	Old Personal Information	Current Information	School Knowledge	Alphabet	Repeating 20-1 Backward	Substitution	Sentences	Digits Forward
A	12	10	10	10	10	17	8	8
B	12	4	5	0	10	4	2	5
C	11	2	1	0	10	2	2	3
D	12	8	10	0	10	4	2	2
E	12	9	10	10	0	4	8	5
F	12	8	10	10	10	17	8	6
G	12	6	6	10	10	4	6	8
H	12	10	8	10	10	8	4	5
I	9	4	1	0	10	4	2	4
J	12	9	8	10	10	6	8	7
K	12	5	7	10	10	2	5	4
L	12	9	10	10	10	17	8	8
M	11	8	10	10	10	0	5	3
N	10	8	10	10	10	0	6	6
O	10	5	6	10	10	0	1	2
P	7	6	10	10	10	0	8	10
Q	11	4	10	10	10	0	8	10
R	11	5	6	10	10	0	4	4
S	11	4	10	10	10	0	5	5
T	10	8	4	0	10	0	1	5
U	12	2	8	10	10	0	6	4
Average	11.11	6.38	7.62	7.62	9.52 (17.14)	7.42	5.09	5.43
Current Norm (From Wells)	11.8	7.2	9.1	9.1	18.4	13.8	5.07	6.3

those that were easy, and those that were difficult. Out of the twelve groups of tests, the highest scores were made on the following: Giving old personal information, current information, giving the alphabet, counting backward 20-1, repeating sentences, digits forward, the easy paired association test, and the recognition test. The greatest deviation from the norm in any of these tests was 1.3. In the tests of giving school knowledge, the substitution test, the second paired association test, giving digits backward, and the test of naming objects, the deviation from the current norm was much greater, being as high as 6.4 and 5.74. The writer did not consider the

substitution test a fair memory test with post-encephalitis cases, as often there was a tremor of the fingers and the hands, which made writing difficult. So, although scores on this test were low, they cannot be taken as indicative of poor memory ability. This difficulty

TABLE 2—SCORES IN TESTS

Patients	Ass'n (No. 1)	Ass'n (No. 2)	Digits Backward	Naming Objects	Recognition
A	10	20	8	4	24
B	4	0	0	4	16
C	0	0	1	2	8
D	10	11	2	0	18
E	9	6	2	5	10
F	10	3	5	4	10
G	4	5	5	5	14
H	8	12	1	4	18
I	5	3	0	3	20
J	9	19	4	6	16
K	6	14	5	6	10
L	10	37	5	6	32
M	10	8	2	5	15
N	9	15	4	6	20
O	8	0	3	4	18
P	9	11	9	4	16
Q	10	13	2	4	22
R	7	2	2	5	14
S	3	14	4	6	8
T	7	1	2	1	18
U	6	16	3	5	10
Average	7.33	10.0	3.14	4.24	14.87
Current Norm.	8.2	16.5	5.1	9.9	15.3
(From Wells)					

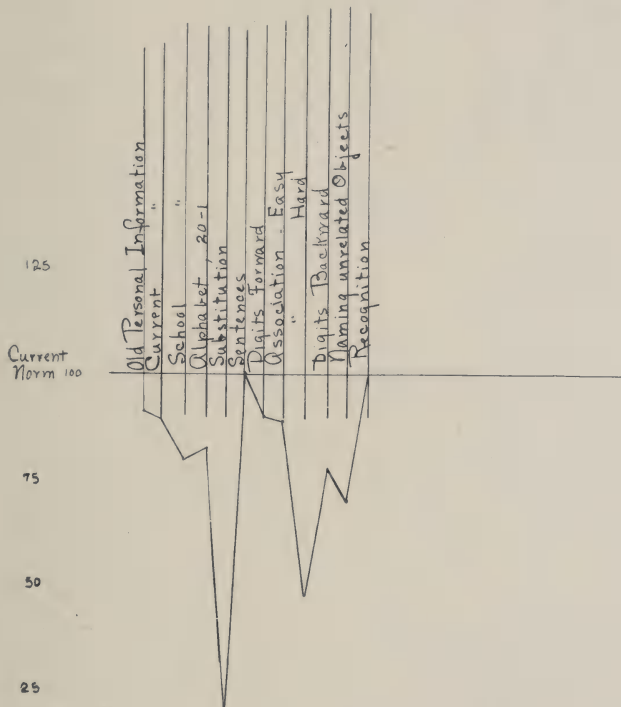
was not met, however, in any of the other tests showing a low average. Hence, it appears that there was a greater loss of memory for remote events and in the more complicated memory processes as shown by the second association test where learning is involved, in the test of recalling unrelated objects, and in the test of giving digits backward.

The chart shows the deviation of the averages from the current norms in the twelve groups of tests. The deviations for each group were secured by dividing the averages of the scores made by the twelve patients by their respective current norms. Then the deviations thus obtained for each of the twelve groups of tests multiplied by 100 were plotted into the psychograph, taking the current norm at 100.

The composite scores and memory quotients are shown in Table 3. These were secured for only twelve patients because, as mentioned before, only twelve were able to take the substitution test and the memory quotient is given for the total score on all the tests. The writer thought that it would be impossible to get an accurate inter-

pulation for a score where the substitution test was omitted. Dr. Wells and Miss Martin have given a table for the general percentage scores or memory quotients based on a norm of 127 points, 185 being the total number of points possible in the test. It was from this table that the memory quotients for the twelve patients were obtained. Referring to Table 3 again, it will be noted that only two patients

Chart - Composite Psychoagraph for 12 patients
Showing Deviation of Averages from Current Norms.



were above the norm, one having an M.Q. of 119, the other of 127, when the norm is taken as 100. This means that $16 \frac{2}{3}$ per cent of the patients were above the norm, none at the norm, and $83 \frac{1}{3}$ per cent below the norm. The average percentile score for this group of twelve was 78.92. It is quite interesting to compare these figures with those of Dr. Wells and Miss Martin in their study of several groups of psychotics where this same memory test was used.

	No. in group	Average percentile scores
Senile conditions.....	8	53
Schizophrenic conditions.....	15	82
Feeble-minded.....	6	52
General paralysis.....	10	68
Manic-depressive depression.....	6	74

From the results obtained by the writer, showing the average percentile score as 78.92 or 79, this group of post-encephalitis cases would be below the schizophrenic group and just above the manic-depressive depression group, all however, being below the norm, and therefore, indicating a loss of memory function.

Thus the average score of each of the tests except one for the number of patients tested was below the current norm. Looking again at the Table 3, it will be seen that there was a great difference

TABLE NO. 3

Patient	Total Score in Tests	M.Q.	Rank Order	Duration of Illness
A.....	151	119	2	1½ yrs.
B.....	66	52	10	2½ yrs.
C.....	42	33	12	3 yrs.
D.....	89	70	9	4½ yrs.
E.....	90	71	8	3½ yrs.
F.....	113	89	4	6 yrs.
G.....	95	75	6.5	3 yrs.
H.....	110	86	5	1 yr.
I.....	65	51	11	1 yr.
J.....	124	97	3	5 yrs.
K.....	96	75	6.5	5 yrs.
L.....	164	129	1	6 yrs.

Average Percentile Score for Group, 79.

in the total scores of these patients, ranging from 164 to 42, and in memory quotients from 129 to 33. The question which interested the writer was this, "Can this difference in performance be accounted for by the difference in the duration of the illness, the disease having caused greater memory deterioration in those patients who have been ill five or six years, than the patients who have been ill a shorter length of time?"

This question could not be answered by referring to the scores made and to the history of the patients' illness without taking into account the question, "What was the patient's memory ability before his illness?" Unfortunately this question could not be answered and this varying factor is ever present in the results of this experiment. In some of the patient's histories was there a record of an intelligence test or memory test given before the onset of the patient's illness, so that memory ability before and after the disease could be com-

pared? Where an intelligence test had been given, it was after the patient had been suffering from the disease for some time, so that an I.Q. in this case was not so helpful. The next best thing was to get the school record and the economic status of the patient and let these factors indicate in a general way what was the intelligence level of the patient before his illness.

Bearing this in mind, the question of the effect of the duration of the disease on the memory loss can be answered by studying the scores made in these tests and the duration of the patient's illness. These figures are given in Table 3. Below are given the histories of several of the cases.

Patient K, age thirty, has been ill for five years. He left school in the sixth grade at the age of sixteen, then worked as a delivery boy and as a chauffeur, his maximum salary being \$25 a week. He entered the army during the Great War and three weeks after his discharge began to complain of having pains in his back and head, of seeing double and gradually he began to lose control of his muscles. He was drowsy most of the time. This condition grew worse. At the time that this study was being made, the patient was walking with a shuffling gait, there was often a slurr in his speech, he had a mask-like facial expression, and a severe tremor of his hands. His total score in the memory test was 96, and his memory quotient was 75.

Patient E, a man of thirty-one years, has been ill over three years. He left school in the eighth grade at the age of eighteen, repeating several grades. He worked as an errand boy and as a bootblack. In the army during the Great War he did guard duty most of the time. His score in the memory test was 90, and his memory quotient 71.

The two cases above can be compared. Here are two men, both evidently of inferior intelligence judging from their school and work records. Patient K had been suffering from the residuals of encephalitis lethargica for over five years, and patient E for three years, yet there is not a great difference in the scores made by these two patients in the memory examination, and a difference of only four points in the memory quotients.

Also Patients H and J are interesting to compare in view of the question whether the duration of the disease causes greater deterioration of memory.

Patient H, age thirty-two, has been ill for about a year. He had a very good school record. After leaving school he was a chauffeur, and was able to make a good livelihood. In February, 1923, he began to have headaches, became sleepy during the day. At one time he slept for two weeks. Since then his condition has been growing worse. Just now he has fairly good motor control, though his movements

are slow. His score in the memory examination was 110, and his memory quotient 86.

Patient J, age thirty-four, has been ill over five years. He stopped school when in the fifth grade because of the necessity of going to work. His progress in school was normal. Before his illness he was a motorman, making \$25 a week. In 1919 he had the influenza followed by pneumonia after which he slept for two or three days at a time. He began to have pains in his head and arms. His gait became slower, and in February, 1920, he became bedridden. He is now up, but has a shuffling gait, a mask-like facial expression, and poor motor control. His prognosis for recovery is poor. In the memory test which the writer gave him his score was 124, and his memory quotient 97.

If, in view of the record and the economic history of these two patients, we may assume a fairly equal native intelligence, and confine ourselves to interpreting the results of their scores in this memory examination by the duration of the disease, we may say that the length of time that the patient has been suffering from the disease makes little difference in the amount of mental deterioration. Patient H, ill for a year, had a lower score and memory quotient than Patient J who has been ill for over five years.

The case of Patient L also tends to show that the duration of the disease seems not to influence the degree of memory deterioration.

Patient L, age thirty-one, has been ill six years. Before his illness he was a medical man, doing very successful work as an eye, ear, nose, and throat specialist. He was graduated from a medical college at the age of twenty-one, and his history before the onset of the disease shows him to be of superior intellect. Six years ago he had a very severe case of influenza, and after his recovery he began to see double, to have pains in his head, to lose control of his muscles, there was a suppression of automatic and associated movements—all symptoms of encephalitis lethargica, as his case was diagnosed. The patient grew worse, becoming helpless and bedridden for a time. Then he gradually gained control of his muscles, and now gets around fairly well, although there is still the shuffling gait and mask-like facial expression, and there has developed a change of character, the patient becoming restless, ill at ease, losing confidence in himself, and also having some delusions. The score of this patient in the memory examination was 164, and his memory quotient 129, the highest total score made of the twelve patients, and showing him above the M.Q. norm by 29 points. This, of course, means no memory deterioration as shown by our tests; in spite of the fact that he has been suffering from the residuals of encephalitis lethargica and his prognosis for recovery poor.

These cases are the most typical ones tending to show that memory deterioration is not influenced greatly by the duration of the disease or its residuals.

Thus, from this study of twenty-one cases of post-encephalitis, the writer draws the following conclusions:

1. Judging from the average scores of each of the tests which were below the current norms, there seems to be, apparently, a memory deterioration of these patients.

2. There also seems to be greater difficulty in tests of remote memory, in the substitution test, the paired association test, giving of the digits backward, and in the test of recalling unrelated objects—tests where the memory processes are more complicated.

3. Judging from our few cases, the duration of the patient's illness apparently has no effects on memory deterioration.

Referring to the first conclusion the writer wishes to emphasize the slowness of movement among these patients. This fact must not be lost sight of in the interpreting of these results. Regarding the average falling below the norm in all of the tests, except one, it is impossible to say how much was due to a deterioration of the brain cells where the process of memory is active, and just how much is due to a deterioration in that part of the brain and nervous system which controls the motor centers operating in the responses of these tests. There seemed at no time to be any difficulty of comprehension on the part of any of the patients tested; but it is apparent that there is a loss of function somewhere.

It is, of course, impossible from this study to make any general statement about the loss of memory function in cases of post-encephalitis. This empirical study may indicate tendencies, but it will require years of clinical observation and scientific investigation, together with an increased knowledge of the disease itself, before it can be definitely determined whether there is always a deterioration of memory in cases of encephalitis lethargica, and whether this loss is permanent.

* * * * *

This study was made under the direction of Dr. H. E. Garrett, Department of Psychology, Columbia University.

SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

ANNUAL MEETING, JANUARY 6, 1925, EDWIN G. ZABRISKIE, M.D.,
PRESIDENT, IN THE CHAIR

ABNORMAL TONGUE MOVEMENTS FOLLOWING ENCEPHALITIS: REPORT OF A CASE

DR. IRVING H. PARDEE

The patient, a boy of seventeen, had a fall on his head in January, 1920. Following this he was said to have been "out of his head." Following the accident there was some indefinite visual disturbance. For six months there was considerable wakefulness. He could not sit still at school and when sitting down, for two years afterward, he would have a compulsion to lean forward with head projecting. Over a year ago he had chewing-like movements, and the present abnormal tongue movements began some months later. In the summer the voice became altered so that he now complains that when he talks "only wind comes out, but no sound." The mouth would open and the tongue protrude; this was soon followed by rhythmical, irregular, choreic-like movements, which have persisted. The father states that the boy's entire personality has changed: from being a bright, alert, snappy boy, he is now slow and his movements are retarded.

Physical examination shows the head forward with slight generalized attitude of flexion. The gait does not show festination, but a marked loss of associated movements is noticed in the left arm. The movements are all somewhat slow. The facies show a lack of emotional play, approaching the parkinsonian mask. There is slight fixation of the right face. The left pupil is irregular and sluggish to light; the right is regular and reacts. There is a tremor of the left arm, of a rhythmical oscillatory type, more marked on rest.

The movements of the tongue are rotary and on extension there is a rhythmical choreoathetoid motion. They are continuous, difficult to describe and cease only when his interest is intently centered.

No ataxia is present, and no dysmetria; there is no alteration in the reflexes. The fundi are normal. X-ray of the skull showed no fracture.

DISCUSSION

DR. E. L. HUNT: It seems to me that the evidence points strongly to encephalitis. The condition as one of the sequelæ of encephalitis is an exceedingly unusual one. I have found reports of the same condition occurring in foreign cases, four from France, and

two from Germany. I have never known of a report of a similar case in this country. One of the cases reported abroad was just the reverse of this one: the tongue remained out longer than it remained in, but it was constantly in motion.

DR. I. ABRAHAMSON: There is no question about this being a sequela of encephalitis. We have seen these tongue movements, but not as marked as in this case. I have seen also lateral movements of the tongue and movements of the jaws, with or without movements of the tongue. A boy now in the Montefiore Hospital presented an opening movement of the jaw, coming on in episodes. That boy's left arm has the same position as the case shown. The tongue movements I have seen in at least six cases; but in no case was it as marked as this. A point of interest is the absence of salivation, in spite of the constant inward and outward motion of the tongue. One would expect that salivation would be stimulated by this. Is the boy getting any hyoscin or belladonna, or something that stops salivation? I have an idea that he will lose the movements of the tongue, as most of the other cases did. The boy at the Montefiore Hospital has some of the movements of the jaw still, but they are getting much less.

Of interest also is one other point. Ordinary parkinsonians get steadier with willed movements, but with encephalitic parkinsonians the movements get worse. If the boy had an ordinary parkinsonian he would halt and then start and get through his sentences. This boy has the greatest difficulty in talking, and this increases the movements of the tongue just the way that the post-encephalitic parkinson increases the movement by intention. This movement resembles a choreoathetoid movement of the tongue. Occasionally in chorea the patient thrusting out his tongue will get his jaws on it and will bite his tongue; but in this patient we have just an isolated tongue movement, without any movement of the jaw. The tongue always stays in straight line in the middle of the lower jaw. The tongue movements are accompanied at certain level of integration with movements of the lower jaw. Here there is no lower jaw movement at all. Did the tongue deviate to the left?

DR. PARDEE: No; it is in the midline.

DR. ABRAHAMSON: The level of integration must be at a different level from that of the tongue acting in conjunction with the lower jaw.

DR. I. S. WECHSLER: There is not the slightest doubt in my mind as to the diagnosis of encephalitis, although it is interesting to speculate on its relation to the trauma. That could come up for decision in case of litigation, but I feel it has nothing to do with the present case. I should like to point out the significance of the patient's tongue movement in view of the accepted anatomical localization of the lesion in a post-encephalitic parkinson, and the fact that jaw and tongue and chewing and chewing movements have been associated with lesions of the substantia nigra. It seems rather strange that cases of encephalitis which show the parkinson syndrome show so few tongue and jaw movements. This particular boy has both the parkinson syndrome and the tongue movement which can be correlated with the

pathological lesion in the substantia nigra, and the experimental physiological evidence adduced by Bechterew and his assistants.

DR. CHARLES BERNSTEIN: I have seen three of these tongue cases. I have one now under observation. The older boy, about twenty, protrudes, rolls, and chews his tongue. The boy about sixteen makes almost the same motion of the tongue as this case. All three were among the feeble-minded, all post meningitic cases.

DR. PARDEE (*closing*): I have nothing more to add, except that I believe the element of trauma in this case has nothing to do with the later developments. I have seen previous cases in which trauma seemed to usher in an encephalitis, just as we see trauma as a predisposing factor in various types of disease, such as general paresis, and so forth. I have under my observation now a legal case in which a parkinsonian syndrome, the result of an encephalitis, began immediately following a trauma. Trauma is thus a factor about which one can only speculate.

THE NEW YORK STATE PROGRAM FOR THE CARE OF MENTAL DEFECTIVES

DR. SANGER BROWN, 2D

Through various surveys in the past we are now in a position to state roughly the number of mental defectives in New York State and therefore to outline their needs. The surveys indicate that there are at least forty thousand mental defectives in the state outside of institutions. We do not need to put all of these defectives in institutions, but we do need institutional accommodations for about ten thousand of them. We now have accommodations for less than six thousand, so we need much additional construction. In respect to the state program, it may be interesting to give a review of the history of the care of mental defectives in the state. The care of mental defectives in New York State was first undertaken in 1851 in Albany. A new institution was built two or three years later at Syracuse where there are now accommodations for about seven hundred cases. The first phase may be called that of special training. At that time Dr. Edward Seguin arrived in this country from Paris much interested in special training of defective individuals, as had been undertaken in France. He became associated with this work at Syracuse. Dr. Seguin had the idea that if defective children were properly and carefully trained they could be brought up to normal in intelligence, or at least that their intelligence could be increased. While this has proved to be contrary to the facts, nevertheless the methods which were instituted at that time in the way of manual education and special sense training were the foundations for the training of mental defectives in this country.

The next phase in the care of mental defectives was a eugenic plan. The second institution was started at Newark, New York, its purpose being for the segregation of women in the child-bearing period. This was opened in 1878. The institution soon became full so that comparatively few new cases could be admitted from year to

year. This plan therefore was of limited value in itself. The next institution was opened at Rome, New York, for chronic low-grade cases of custodial type. In 1907 the institution at Letchworth Village was planned, construction being started somewhat later. This institution has developed along modern lines which are more comprehensive.

In the administration of these institutions there are three main types to care for: 1st, the school cases; children of about the type which we get in the ungraded classes in the public schools. 2d, Adults requiring segregation and institutional care. 3d, crippled and infirm who require nursing. In the state organization more recently has been added the institution for males at Napanoch and the division for defective delinquent women at Bedford.

In these institutions for mental defectives the training policy plays a very important part. About one-third of the inmates are children of school age to whom special training is particularly applicable. It is for this reason these institutions are called State Schools for Mental Defectives, and a teaching staff with a head teacher is provided for this work. The other main feature of the institution is of course the psychiatric work and the general medical supervision.

From these schools have developed the colony system as inaugurated by Dr. Charles Bernstein of Rome, New York. This is a new development in this country in the care of the feeble-minded. He places boys out to work on farms in colonies. For girls he rents a cottage in one of the factory towns and places the girls there under supervising matrons. Many such colonies have been started throughout the state.

In addition to the institution work, therefore, with its colonies and parole of cases, is the work directly under the commission. Clinics have been started throughout the state for diagnostic cases, there being at present 53 in all. Five social workers are directly under the commission to supervise these clinics and to carry on the after-care work.

In summary, then, the present state policy consists of a combination of those methods which have been worked out in the past and have proved satisfactory, and is as follows: development of institutions for the care of all types requiring it; special training for proper cases in the institutions; segregation of other types; social rehabilitation through colonies and parole as far as possible; diagnostic clinics throughout the state connected with the public schools and courts; social supervision by field workers; full use of the special classes in the public schools; special institution for defective delinquents.

DISCUSSION

DR. CHARLES BERNSTEIN: Dr. Brown has been very active in helping us to a more useful and more practical program, and has helped us in our viewpoint of problems which ten years ago everybody approached from other viewpoints. The physicians were indifferent to the problem of feeble-mindedness, and left it to the

social workers and psychologists and women who never had and knew little of children. Surely anyone who observed the work closely twenty years ago saw this situation. Another aspect of the problem is that they were asking the state to appropriate more and more money for palatial structures in which to place the feeble-minded in custody for life. The only ideal was to duplicate the system of state hospitals for the care of the insane. This was going on under the urge of the eugenists who felt the thing should be done that way. We found these people were very efficient doing the work in institutions, and we found we had more people in the institutions who were able to work than could economically be kept occupied. They were just as troublesome in the institutions when unoccupied as outside, and sex perversions prevailed. There was a lot of human energy pent up which would surely crop out abnormally somewhere unless otherwise consumed or relieved. As the work developed, we saw there were two situations wherein there was great demand for help; one, agricultural work for boys, and the other domestic work for girls. We found that we could just as well send the boy out to a farm and send the girl out to do domestic work, and that many would be just as well thus supervised, and probably we would hold them longer under supervision than were they held indefinitely in custody in the institution, and surely in this way train them much better to succeed later in the world as a result of such parole and extra-institutional supervision, and thus carry out a much more practical eugenic program than any system of life custody yet devised, principally because we can in this way care for so much larger a number and guide them in an economical as well as humanitarian way for so much longer a period; in fact, as long as seems necessary in each case. When the girls' histories are looked up, we find that they are leading fairly decent human lives, and most of them are socially and economically efficient. They or their relatives did want the money they earned, but later we were fortunate enough to get the Legislature to give us control of their earnings. Mr. Davis, who is working with the State Charities Association, brought out the point that we were stabilizing the feeble-minded. We do know that these feeble-minded people will form good habits of life, and if they repeat them for years in succession, they will pretty nearly always retain them. I know that some of these feeble-minded are more stable-minded than some of my unclassified friends. As a result of these activities, we are carrying 900 people in colonies, 22 farm colonies for boys with 450 boys, and 14 colonies for girls, with 440 girls, and 500 people on parole. We find that when Johnnie is fourteen years old, he gets no farther in formal school; he is incapable of further school progress and is becoming troublesome to handle and supervise because of larger energy and interests which must be usefully liberated and directed along manual and industrial lines. The idea is to get him out where his energy can have an outlet. We place 20 to 24 boys with a farmer and his wife who have had experience in institutional training as well as farm life and understand handling these boys on a rented 100 to 200 acre farm. Girls are

sent to the colonies in towns to do domestic work in small average grade families. It is our policy to approach this problem in a human way, and we can thus advance a much stronger eugenic program and carry it out with the feeble-minded, especially as sterilization and other extreme measures universally fail. I know of three women in which sterilization was done, in which the results tend to support the present public attitude toward sterilization as a failure and impractical measure. One typical case, a girl of a wealthy family, who could not be kept off the streets, was sterilized and is now passing syphilis along. The English Commission, who studied the subject of sterilization, came to the conclusion that probably the second or third generation would suffer more from degeneracy, as a result of ravages of syphilis and venereal disease, than they would from the feeble-minded offspring of such unsterilized feeble-minded. Another aspect of the problem is that the great majority of all idiots and low grade imbeciles who might be reached through sterilization measures are low grade organic cases and would never reproduce. They are not really the hereditary type of cases with possible hereditary transmission, and really constitute only 20 per cent of the feeble-minded problem. We are dealing now with 80 per cent morons and 20 per cent idiots and imbeciles. I believe the moron is a normal part of the human race in the process of evolution. We have had some experience in support of this at Rome. We have been taking in feeble-minded women who are pregnant or with a small child. We have had 250 of these children in the last ten years. We have had also 400 morons go out who have married. Our field workers are studying these cases. There are enough data to show that the so-called family condition of mental degeneracy does not exist. It is really regeneracy. We may not have offspring of much greater intelligence than their parents, but we will have more stabilized and better trained individuals, and we need stabilized individuals (morons) to do the common work of the world. Our morons must grow our vegetables and food for us, and this they may do and remain at the same time in a simple rural environment, which is not too complicated for them, and in which they are rendered happy and contented. The brighter people won't stay on farms and do the hard work. The interesting thing is that if we place the stabilized moron and keep him in a simple environment, as on a farm, he is just as much a fixture there as the dog or the mule. The farmer likes the moron, and the moron likes the farmer.

That is the problem as I see it to-day. Approach it from a common human standpoint and we may solve it.

We know what Nature does with organs or functions which are no longer needed, and I am sure she will thus deal with the moron when such an individual is no longer useful. We were told that the moron was a prolific reproducer. We have had experience enough to know that that is not so. The imbeciles in our experience are the prolific reproducers. Among the 400 women who left Rome and who married, not one had more than four children, and they averaged less than two children per family, over one-half of them having no

children. Possibly training does for the moron what it does for higher grades of society. We know that the graduates of Harvard, Yale, and Vassar reproduce fewer children than the average family. There is apparently something organically basic here. I know the birth control people have not helped the morons who have passed under our observation.

DR. L. PIERCE CLARK: The excellent work Dr. Brown has done in getting this problem into the field of medical sociology should be appreciated by all of us. It places the problem in a very humanistic light. Dr. Bernstein's work is almost epoch-making in handling the moron and the placing of the final product. It is unfortunate that medical men have in many instances confined themselves so closely to medical pathology, and have not taken cognizance of the fact that mental defectives cannot be properly handled in private families. It is unfortunate for the institutions that they do not correlate their functions sufficiently so as to take into account these human beings. The problem will remain in the hands of very special workers, and we suffer in not correlating a larger number of the mental diseases of this branch of neurology.

DR. JOSHUA ROSETT: Will Doctor Bernstein please explain what he meant by saying that the moron is a normal part of the human race in a process of evolution?

DR. BERNSTEIN: I mean that the processes of evolution have not gone on to perfection in a great many lines; by-products useful for the time are frequently evolved, and that Nature produces pretty nearly what she needs as humans to carry on the work of the world. There was a time when people of a higher grade of intellect were willing to stay on the farms and work and go into the factories. They do not do it any more. Somebody must do the common work of the world. We know that Nature takes care of such situations, and that is why we think that so long as Nature needs the moron (and Nature needs more morons than ever before), we will have them. We see this principle evidenced in the birth rate. In Germany within three years after the war there was a larger birth rate of males than females—nature's need to balance the sexes in the interest of progress.

DR. BERNARD GLUECK: In order to appreciate fully the significance of the state's program with respect to the mental defectives of this state as outlined so ably by Dr. Brown, one has to recall what this situation has been in this respect only twenty-five years or so ago. When one remembers how misunderstood, neglected, and abused these unfortunates were in the past and that even to-day in some parts of the country there is practically no special provision for the case of these handicapped people, we have just cause to be proud of the manner in which the problem is being dealt with in this state under the able supervision of Dr. Brown. He has told you that we have about 40,000 defectives in this state. I think if one were able to take into account the various social institutions, such as prisons, jails, and reformatories in which undoubtedly large numbers of defectives are housed, the problem would probably be found to

be much more extensive than it appears from merely studying the situation in what are primarily medical institutions.

There is no doubt that the progress in dealing with this problem is due in the main to the fact that it has become chiefly the concern of medical men, and in this connection the vision and the courage and determination which Dr. Bernstein has shown in his pioneer work in dealing with defectives ought to receive our admiration. He has demonstrated in a very practical way that many of the evils which are bound up with the life and conduct of the feeble-minded should justly be considered as unnecessary and avoidable evils and that a good deal of the career of the feeble-minded depends upon the manner in which society deals with his problem. I am in the habit of saying to my students that the feeble-minded furnish the raw material out of which an unintelligent and reckless social management of this problem creates the problems and difficulties of the feeble-minded. We ought to reiterate the fact that it is erroneous to approach this situation with the view that the feeble-minded is essentially vicious or criminal or antisocial and that frequently when he becomes so it is due to the unintelligence and sometimes direct viciousness of the more intelligent members of the community in subjecting the feeble-minded to tasks which they cannot possibly meet.

In these modern institutions in our state, of which Dr. Brown gives account, the feeble-minded individual is exposed to a continuous influence of training in habit and performance which enables him to develop to his fullest capacity and to acquire ways of adjusting himself to life, which I am sure eliminate many of the difficulties that are reflected in such institutions as jails, correctional houses and also those dealing with the problem of illegitimacy.

I am not altogether in accord with Dr. Brown's suggestion that the public schools offer a constructive possibility in dealing with the feeble-minded. I am aware, altogether too keenly, of the shortcomings of the public school system in dealing even with the normal child and at the present time, at any rate, there is not enough energy or means available to provide for the needs of these handicapped individuals. Moreover, the training of the feeble-minded is a twenty-four hour job if it is to be at all constructive. One would like to see the state program develop to a point to enable every feeble-minded child in the community to go through a period of institutional training preparatory to life under supervision of some sort in the community and from what we have listened to to-day I think we ought to be encouraged in the belief that under Dr. Brown's guidance the entire program will eventually develop to its fullest capacity.

A RÉSUMÉ OF RESEARCH WORK AT LETCHWORTH VILLAGE

DR. HOWARD W. POTTER (By Invitation): *Abstract:* A brief history and description of Letchworth Village with special reference to its Research Department is given. A résumé of certain studies of mental deficiency at Letchworth Village may be summarized as follows:

1. *Classification of mental deficiency.* A classification has been adopted based on mental level, physical make-up, and personality characteristics. The need for some such classification is imperative because defectives differ, one from the other, in respects other than the mental age, and hence a pertinent clinical classification is required for purposes of diagnosis, treatment, prognosis, and general discussion.

2. *Etiology of mental deficiency.* Based on a study of 980 cases at Letchworth Village, the etiology was apportioned as follows: In 49 per cent there was a history of mental deficiency in the family; in 15 per cent of insanity or epilepsy in the family; and in 9 per cent of alcoholism, antisocial behavior, or dependency in the family.

In 1 per cent there were unfavorable prenatal conditions; in 1.5 per cent convulsions in infancy; in 5 per cent cranial injuries at birth or early childhood; in 5 per cent infectious diseases involving the central nervous system; in 1.5 per cent infectious diseases other than those directly involving the central nervous system; in 8 per cent endocrine disturbances; and in 5 per cent no cause was found.

3. *The personality of mental defectives.* It is clear that knowing merely the mental age of a defective tells us little as to the possibilities of that individual. A personality study of the defective is designed not alone to classify or label the individual, but to supply information that may serve as a starting point or a working basis for constructive effort. A study of the personality is essential for diagnosis, understanding the basis for social and economic maladaptations, and a useful guide for training and social direction of the defective.

4. *Relation of endocrine dysfunction to mental deficiency.* A clinical survey showed that 37 per cent of the patients in the institution had some type of endocrine imbalance. Endocrine treatment is thus far not especially encouraging; only an isolated case here and there showed any tangible mental improvement.

5. *Comparative study of hereditary (primary) and nonhereditary (secondary) mental defect.* Idiots and imbeciles predominated in the nonhereditary group, and morons in the hereditary group. There was a very definite retardation of physical development in the hereditary group with no such retardation in the nonhereditary or secondary group.

As an aftermath, the writer wishes to point out that the discussion ensuing the presentation of this résumé indicated two pertinent facts: 1. The marked diversity of opinions, expressed and implied, undoubtedly showed the need for a clinical classification such as is suggested above, because each speaker, while discussing the subject, was misunderstood by the rest of the audience, despite the fact that what he stated was quite applicable to a certain clinical type of moron, imbecile, or idiot. 2. What is most important of all, the discussion plainly showed our need for intensive research into this huge problem of mental deficiency.

The responsibility for this work at Letchworth Village rests with Dr. Little. If it had not been for his determination to overcome all obstacles there would have been no research project.

CLINICAL ASPECTS OF MENTAL DEFICIENCY

DR. I. T. BROADWIN (By Invitation): This paper is based on a study of the cases met with at the Mental Clinic of the Department of Public Welfare, New York City. Mental defectives, epileptics, and individuals presenting mental disorders of one type or another are referred here for diagnosis, disposition to the various institutions, and recommendation for further home care.

The clinic averages about 1,300 new cases a year. About one-half of these are diagnosed as mental defectives, and 10 to 15 per cent are epileptics. A small percentage are individually represented by psychopaths and postencephalitic conduct disorders in children. The remaining number are considered as borderline, dull normal, and normal. Many of those who were not diagnosed as mental defectives presented distinct conduct disorder problems.

The cases are examined in the usual manner. The examining physician who obtains the history from the parent or relative pays special attention to the eliciting of such facts as morbid heredity, type of birth, infectious diseases and convulsions in early infancy of the patient. The early developmental history of the patient is a subject of detailed questioning. Many of the facts obtained can bear close scrutiny in the matter of interpretation; this especially applies to morbid heredity, difficult labor and trauma. A psychometric test is given by the psychologist. A general physical and neurological examination is given by the examining physician. The diagnosis is established after the physician has completed a psychiatric examination. In this latter examination the patient's character and emotional make-up are open to investigation.

In the causation of mental deficiency, the factor of morbid heredity is usually stressed. Tredgold classifies mental defectives, or amentias as he terms them, into two main groups: primary amentias, in whom the germ plasm is defective, due to morbid heredity, constituting about 85 to 90 per cent of the cases, and secondary amentia, in which the growth of the brain has been interfered with or arrested by disease or other adverse environment. This latter group constitutes about 10 to 15 per cent of the cases.

On closely studying the histories obtained in the clinic, it was found that the history of morbid heredity was not so frequently obtained. It was further observed that about one-half of the cases presented clinical evidences of involvement of the central nervous system. The association of central nervous system involvement and mental deficiency both dated from early infancy and can undoubtedly be assigned to the same cause.

These observations would apparently permit one to conclude that morbid heredity was a less frequent factor than usually considered and that cerebral involvement due to infectious disease and other adverse environment were more common than Tredgold considers them to be.

To study further the observations mentioned, 175 were divided by an arbitrary classification into two groups. Group I consisted of 87 cases presenting evidence of central nervous system involve-

ment as evidenced by abnormal size of skull, pyramidal and extrapyramidal signs, and definite cranial nerve defects. Microcephalics, mongols, definite endocrine syndromes and congenital luetics were considered as admissible to this group to make it more inclusive. Group II consisted of 88 cases, presenting no evidences of central nervous system involvement. In Group I the following clinical diagnoses were made: cerebral diplegias and infantile hemiplegias, 34 cases; postinfectious, 16 cases; Froelich syndrome, 5 cases; cretinism, 1 case; mongolism, 1 case; microcephalus, 4 cases; hydrocephalus, 5 cases; congenital luetics, 3 cases; posttraumatic, 1 case; tuberous sclerosis, 1 case; amaurotic family idiocy, 1 case; unclassified, 11 cases. In the postinfectious subgroup the infection occurred before the age of two years. Morbid heredity was elicited in the histories of seventeen cases.

Group II, morbid heredity was elicited in the histories of only fifteen cases. No special significance is placed on this finding in either group except that it does not appear to be more frequent in one group than in the other, and that it is not found in the majority of the cases. Convulsions and fever occurring in early infancy were found in eight cases. Trauma as a factor was elicited in the histories of nine other cases. This left 56 cases for which no apparent cause could be assigned.

The part played by such factors as fetal encephalitis, chemical toxins, and trauma at birth are still matters of investigation. A large group of the cerebral diplegias as described by Collier have been considered to be due to a neuronc degeneration which is self-limited in progression and shows selectivity in the tissues involved. It may be conjectured that a similar process may be at the basis of many of the cases of mental deficiency.

The study of the cellular structure of the cortex gives promise of much that will be helpful in determining the pathogenesis of mental deficiency. The study of the etiology of mental deficiency belongs to many departments of investigation; it appears, however, that the neuropathologist will be able to throw much light on this problem.

Institutionalization seems to be the logical solution to the problem of impossible adjustment to extramural life. Suitable training at home or institution early in life may so equip many of the higher grade mental defectives as to permit them to hold a place in life outside of an institution.

GENERAL DISCUSSION

DR. L. PIERCE CLARK: I think it is worth while saying again that it is unfortunate the means for investigating the causation of feeble-mindedness has been so enormously retarded in all fields of medical pathology. It is not even on an equal footing with the work in the hospitals for the insane. It is amazing to see that most of the work recorded in the textbooks has been done on practically two cases only. It is absurd to draw any conclusions from anatomical and histological study of the brain in this small material. It is very

unfortunate that the feeble-minded have been more or less annexed to psychiatry. The psychologists annexed them first, then the eugenists, and up to about a decade ago, it seems as if by the accumulated interest of these men they placed at least 85 per cent of feeble-mindedness on purely hereditary lines. Slowly and gradually this semiclinical-pathological-psychological theory was undermined by the accumulation of actual data to the contrary. It has got down to 50 per cent, or possibly lower. That psychiatry has no province here in determining the causation of feeble-mindedness is true. We have to look at defectives as systems of feeble development, not wholly of the brain, but of the whole organism. It is a biological problem in its largest aspects pertaining to the whole individual and to special phases of feeble development.

The purely clinical definition of types is valuable, but no longer gives evidence that it will solve the problem as to the causation of the disease. We have got to make careful studies of the metabolism in whole series of families, using experimental laboratories, and working with animals on which we can get controls, something after the manner of Davenport and Stoddard. The whole issue of the causation of feeble-mindedness is practically determined before birth. Therefore the problem of prevention must rest on very careful research in endocrinology, metabolism, the enzyme and hormone factors, and the germ plasm development. In order to carry out that work, I have served on a committee connected with Letchworth Village since its beginning, and have urged various legislative bodies to give sufficient funds to carry on similar forms of research. Dr. Little and Dr. Potter have been most successful in getting small sums for the investigation into the causes of mental deficiency. If the state would give the necessary equipment for investigation it probably would not pay for the kind of personnel that is required; \$40,000 a year would be needed for the personnel alone.

In regard to endocrinology, transmissive and transformative mechanisms, as physicians we are wholly aware of the enormous advance that has gone on in the study of biochemistry and physiological biology, so that we see the whole problem passing from a purely psychological and psychiatric one into the field of experimental biology. Unless we are prepared to back this meager beginning, which has been so excellently handled, on a broad and comprehensive basis, and secure the proper personnel, we cannot get far by simple clinical and pathological work. The National Research Council has indicated that it will make a contribution, and I hope we can get the financial means necessary for the clinical and experimental study of this problem.

DR. WALTER TIMME: The problem of feeble-mindedness may perhaps be roughly divided into two groups, one of which is beyond all help from the very beginning. That is the group which depends on anatomical malformation, either through injury or through hereditary conditions. The other large group is that which is functional, not organic and not anatomic. That functional group is the

one which can be helped, and that functional group depends to a large extent upon disease of the parents, systemic diseases, such as tuberculosis and syphilis, but to a much greater extent upon hereditary or acquired endocrinopathies. I believe that Dr. Potter stated that of his group 8 per cent were endocrinopaths. That was possibly a rough estimate. I advised Dr. Potter at the time of sorting the various groups, and it was rather a hurried sort of choice. In order to determine really whether an endocrinopathy exists is a matter depending upon very deep study. The fact that the patient shows superficial anomalies in growth, or hair structure, or skin texture, or stature discrepancies and disproportions is not sufficient to determine an endocrinopathy, for the reason that a great many persons apparently normal, will develop these structural manifestations that appear to be endocrinopathies, as a compensatory effort for a disturbance that was preëxistent, and hence we see the results of conditions which we did not know existed. Among this group of cases is one which is of tremendous importance. We have through the work of Marine and others recognized the influence of minute quantities of iodine in the early periods of life, even in intrauterine life. The experiments on tadpoles, by Gudernatsch, Swingle, and others, determined that without iodine they never become differentiated. They remain tadpoles, and may grow to be enormous in size, but they never differentiate. We feed them iodine, and they develop into their next developmental stage. We are prone to regard as the only evidence of the lack of iodine the so-called colloid goitres, chiefly seen in women in the goitre belt. It is a gross error to consider that as the only manifestation. It may be the only *superficial* manifestation. There are only comparatively few instances in which the evidence of the lack of iodine shows as simple goitre; but there are three or four times that number of people who have no goitre who show in their entire lives this deficiency in iodine in other tissues than in the thyroid gland, and so I have come to classify these cases, both in my clinic and in my own work, as a special group. This group comes from the so-called goitre belt, the lack-of-iodine belt. This is much more extensive than the records published would lead us to expect. It begins at Seattle, and goes east through the Northern States, Montana and Idaho, and is, of course, prominent in the Lake States. It goes through central New York State, through the Finger Lakes and Glens Falls, and thence to Lake Champlain and the Berkshires. There are a few patches in West Virginia and in other isolated areas. Southern Germany, Roumania, Western Russia, and the Ukraine contain such belts. When you begin to divide your feeble-minded patients into groups according to their birthplace or that of their parents, the number that come from these regions is astonishing as compared with those from regions that so far as we know are normal. So you get many cases of Froehlich's dystrophy and other very pronounced endocrinopathies from these regions. These cases are not due to a deficiency of thyroid. If you examine them by the very irregular and inaccurate method of basal metabolism you may find a very slight disarrangement, a rate that may be considered normal. It is

not a deficiency or an excess of thyroid. It is an *inefficient quality* of thyroid secretion. It is a thyroid which probably lacks more than iodine, but iodine is the only element which we have recognized as being deficient. These patients represent only one group of a large number of endocrinopaths that have their beginnings there. They do not all show the same picture. It depends on how they react with their comparatively normal organs to this lack of one or another element as to what their manifestations are going to be. That is the endocrinological-pathological problem—not a simple matter of determining whether they are acromegalics or dwarfs or giants. We have got to recognize the original lack which has prevented them from growing up, from differentiating, from developing and from functioning, and then we will be in a fair way not only to understand this particular group of feeble-mindedness, but to treat it. Even in later years that lack of iodine can partially be compensated for. I believe that all our efforts should be directed toward that group of remediable feeble-mindedness. All the money should be spent on approaching the type that can be helped, rather than on that which cannot. But in spite of what Dr. Bernstein, who has done as much or more than anyone else in helping these people to support themselves; in spite of what he says that sterilization will work just as much harm to the race through their acquiring syphilis and gonorrhea and their transmission of these diseases through their promiscuity, our problem is nevertheless to sterilize them, but at the same time prevent or cure the syphilis and gonorrhea. Feeble-minded people should not be allowed to propagate and thereby diminish by just so much the quality of the germ plasm of those few that are still able to conduct a republic, so-called. When Dr. Bernstein further says that the moron in his opinion is man in a state of evolution, I disagree entirely with him. I should like to ask, if this were so, and the morons were allowed to propagate among themselves, would they not reach gradually a higher state of evolution and become normal? But they do not develop. There is a defect in their germ plasm which can never be remedied, for if it could be, and this improvement be passed down to their offspring, we would be confronted by the transmission of acquired characteristics—a theory which has been practically exploded.

DR. BERNARD GLUECK: I have very little to add to what has already been said. No one who has listened to Dr. Potter's paper can fail to appreciate the significance of his researches into the causation of feeble-mindedness. But there is another phase to the enterprise of the scientific study and management of the feeble-minded which not only helps in clarifying the problems of this group, but also serves as a guide in the habit training and particularly in the reëducational task of children, who, although of normal intelligence, manifest various difficulties of behavior and adaptation. Dr. Potter's study ought to contribute to the very important problem of ways of conditioning human reactions and although his work is being carried on in connection with the feeble-minded, many of his findings are equally applicable to those normally constituted. The opportunities of an institution devoted primarily to research are par-

ticularly favorable for the study of the extent to which the so-called primary characteristics are fixed or organic or constitutional, and to what extent they are modifiable. This phase of the problem of behavior has had very little illumination thus far, and I am sure that Dr. Potter's work is bound to contribute to its clarification.

Dr. Timme's reference to the place of the endocrine problem in the field of feeble-mindedness is, of course, of tremendous importance. We know what the possibilities are here for stimulating growth and development when the endocrine handicaps to this are determined and dealt with, but over and above the modifications that can be produced through endocrine therapy, there is the problem of habit training in social adaptation which in the last analysis is a psychological issue and in respect to which up to the present time the greatest contributions have come from the side of psychoanalysis.

Careful, controlled work with the feeble-minded ought to illuminate the entire problem of the conditioned reflex and the more complex problem of the socialization of human nature, and the members of this society particularly ought to see to it that Dr. Potter's work receives the proper recognition and encouragement.

DR. I. J. SANDS: I would like to add a few words to the discussion of feeble-mindedness as I see it in private practice. We are here to-night to get the opinion of the men who are working with these patients in institutions, and to learn from them methods that will help us in meeting these problems in our private practice. As far as the etiology is concerned, we know nothing about it. The hereditary element has been mentioned, and yet nothing has been mentioned that might shed light on the subject. We meet mental defectives in the finest of homes and in purebred families. We all know that some eminent people have them in their own families. If you call it a weakness of the germ plasm, why should that weakness show itself in only one member and spare the rest of the family? Disturbance in the endocrine system is no more frequently found in morons than in those of normal intelligence. It is rather rare to find endocrinological disturbances in those having mental ages between seven and eleven years. Dr. Timme said that it may be due to some thyroid disturbance. As a matter of fact, the general practitioner has been taught to recognize hypothyroidism quite early. Hypothyroidism plays a relatively small part in mental deficiency. There are many individuals of normal intelligence who have been taking thyroid gland extracts since infancy, and there are mental defectives who have received thyroid extract without any benefit whatsoever. The other gland that is usually mentioned in conjunction with this problem is the pituitary body. And yet in this case, too, we have little knowledge concerning the influence of the pituitary on intellectual development. We know a good deal about the influence of this gland on the somatic development of the individual, but we know very little of its effect on the intellectual development of a person. Our patients presenting Froehlich syndromes are often superior in their intellectual equipment. I feel that there are two factors that play important rôles in the develop-

ment of mental deficiency. One is disease in the mother during gestation—acute infectious diseases that circulate toxins in the blood, such as pneumonia, typhoid fever, and nephritis, which undoubtedly affect the brain of the child. The second is the injury done to the child's brain at the time of birth. I have closely followed the work of Dr. Wilson who has autopsied every stillbirth and every child dying under one week of age. It is surprising to find the number of small hemorrhages in the brains of these patients. We have searched the literature and found it rather poor about the subject of injury to the brain caused at birth. I firmly believe in Dr. Bernstein's stand on the subject, for I have followed his work very closely. I am glad to have had the opportunity of listening to his discussion to-night. We may read of the opinions of an innumerable number of physicians, but whenever we wish to know of something concretely that has been done for the feeble-minded, in New York State, at least, we almost always go back to Dr. Bernstein's work. I fully agree with him that those defectives who show gross neurological disturbances fall into the idiot or imbecile divisions. These two groups offer very little as a problem both for study as well as for management. The idiot cannot exist outside of an institution, and this holds practically true in the case of the imbecile. It is the moron who lives outside of institutions who presents the real problem. The problem of the moron has assumed undue importance in recent years because of restrictions in immigration. The unskilled labor which has until recently been furnished by the immigrants, must now be supplied by the moron group of the native born. The physician, and especially the neuropsychiatrist, will have to help in the solution of this sociological problem which has arisen because of restriction in immigration. As I see it, the problem of mental deficiency is really the problem of proper training in good habits and in some sort of vocation whenever possible. I fully agree with Dr. Brown that the school is the place where this training should take place.

DR. CHARLES BERNSTEIN: Dr. Timme asked a question. He said that the inheritance of acquired characteristics has never been proved. Let me recall an example. We never had a horse that could trot as fast as a horse could run until we developed one. Whenever we urged them to trot faster, they would break into a run. But in time we developed a horse that could trot faster than a horse could run, which was an acquired habit far beyond the natural (Redmore: Dynamic Evolution).

Regarding training feeble-minded in schools, Miss Farrell, who has made a study of this, shows what happens to the morons trained in special public schools. Somebody asked twenty years ago what of the morons in school at that time, and what has happened to them since leaving school, and it was decided to investigate just this problem, and select a place where the best school records were available. In Cincinnati it was found boys and girls who could not make the grade or lagged behind the grade finally left school either at

or before the age of sixteen and went to work. Nearly all made good in the community through serving an apprenticeship as was possible then. Now apprenticeships are very limited because of changed labor conditions and modern child labor laws require working certificates which are not issued to those under sixteen years of age, except in special conditions in very limited cases. Thus the greater need for special manual, industrial and vocational training for morons. At that time they did not have Child Labor Laws. They were giving the morons a chance for a job.

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY.

1. VEGETATIVE NERVOUS SYSTEM.

Faber. PERNICIOUS ANEMIA AND PROTEIN SENSITIZATION. [La presse méd., 1922, LXXXI, 873.]

Faber for several years had good results in the treatment of pernicious anemia from the administration of fermented milk (kefir). It was thought that the action of this kefir might be due to its protein effect. Therefore a case of pernicious anemia which failed to respond to the ordinary methods of treatment was when almost moribund given an intramuscular injection of five c.c. of sterilized milk. There was an intense immediate reaction with a high fever, which was followed shortly by a very marked subjective and objective improvement. Subsequent cases similarly treated have shown various results, but some have been definitely improved. These observations led Faber to some very interesting speculations concerning the pathogenesis of pernicious anemia. He summarizes the familiar arguments for the origin of pernicious anemia in an intestinal intoxication. He points out that the achylia, which is known frequently to precede the onset of the anemia, will permit an abnormally abundant bacterial flora in the part of the intestine in which absorption is most rapid and will also permit the proteins of the food to reach the small intestine practically unchanged. Thus he thinks proteins may be absorbed as such and sensitization result. He suggests then that pernicious anemia may be a "sort of chronic alimentary anaphylaxis" and that the relapses and remissions may be due to variations in the immunity of the organism.

Holm, E. SPLENECTOMY FOR PERNICIOUS ANAEMIA. [Uges. f. Laeg., Dec. 21, 1922, p. 1781. B. M. J.]

E. Holm has investigated the records of splenectomy for pernicious anemia, and has been struck by the unanimity with which the authors of these reports hesitate to claim permanent cures. The behavior of this disease is notoriously capricious, and the marked improvement often observed after splenectomy is apt to end in the relapses which frequently follow periods of spontaneous arrest of the disease. It should be noted that, even in an advanced stage, the disease may suddenly and unaccountably take a turn for the better, and that this improvement may be maintained for a considerable period. With these reservations, the author publishes a dramatically successful case of splenectomy for pernicious

anemia. The operation was performed on August 5, 1921, and when the patient was last examined, on July 7, 1922, her improvement was well maintained, she could work all day, and continued to gain weight. But the blood picture was still that of pernicious anemia, and the red cells, which had numbered 760,000 before the operation, had increased only to 1,725,000. In the same period the hemoglobin had risen from 35 to 65 per cent (Sahli). The author concludes that though splenectomy does not deserve the place of honor in the treatment of pernicious anemia, it may yet be indicated in those cases in which more conservative measures have failed.

Panton, P. N., Jones, A. G. M., Riddoch, G. PERNICIOUS ANEMIA.
[Lancet, Feb. 10, 1923, VI, No. 5189. J. A. M. A.]

The clinical records of 117 cases of pernicious anemia are analyzed by Panton, Jones and Riddoch. The average age of the patients was forty-six, with extremes of twenty and sixty-eight, the average duration of symptoms up to admission to hospital was seventeen months, the two extremes being seven days and six years. One hundred and seven patients complained of weakness, and in forty-nine it was the chief complaint. Thirty-three patients had noticed a change of color. The primary complaint of eight patients was loss of weight, and twenty-six patients were noted as being wasted. Fever was noted at one time or another in ninety cases, the average range being from 99° to 100° F. It was noticed in studying the temperature charts that improvement in a patient's condition was, as a rule, synchronous with the disappearance of the fever. Further, the more acute the case, the more constant was the presence of the fever. Eighty-six patients complained of symptoms referable to the gastrointestinal system; in fifty-three cases complaints of this nature were primary. On analysis, fifty-one patients complained of vomiting, thirty of diarrhea, twenty-six of anorexia, and twenty-four of epigastric pain. The authors are not of the opinion that oral sepsis has any proved etiologic significance in pernicious anemia, although it cannot but be detrimental to a patient's health and may at times produce a secondary anemia such as is caused by any other chronic suppurative process. While the very frequent occurrence of achylia was noteworthy, it is not considered an essential etiologic factor. Hematemesis was complained of by three patients, and in one instance only was it copious. The spleen was palpable in twenty-one cases, and the liver was enlarged in nineteen cases. Sixty-three patients complained of cardiovascular symptoms. Sixty-two patients had cardiac murmurs. Twenty-five patients complained of headache and eighteen of numbness and tingling of the hands and feet. Albuminuria was present in twenty-four patients, two passed bile pigment in the urine, and one showed glycosuria. In the author's opinion, recovery from pernicious anemia is an event of such rarity that it cannot be accepted in any case without the fullest confirmation.

McDonald, S., and Shaw, A. F. B. PERSISTENT EOSINOPHILIA WITH SPLENOMEGALY. [British Medical Journal, Nov. 18, 1922, No. 3229, p. 966. Int. M. D.]

A case of persistent eosinophilia associated with a high total leukocyte count, and marked splenomegaly, is reported. This condition is extremely rare; only two similar cases have been reported. Splenectomy resulted in marked initial improvement of the patient's general condition, but in distinct aggravation of the blood changes. Prior to operation anisocytosis and poikilocytosis were present to a considerable degree. The abundant eosinophilic leukocytes were, for the most part, larger than the normal. Following operation there was a slight increase in the diameter of the red-cells, and a diminution in their number. The number of the leukocytes increased steadily. There was a gradual decrease in the percentage of polymorphs, with a corresponding increase in the lymphocytes, possibly due to the operation. The percentage of eosinophilic myelocytes was consistently small, both prior to and following operation (1 per cent). The eosinophils appeared to be less fragile than normally, and ruptured cells were rare. There was distinct vacuolation of the cytoplasm of the cells.

Histologic examination of the removed spleen revealed enlargement and the presence of numerous eosinophils, and reduction in the number of the malphigian bodies. Eosinophils were also numerous in the hemolymph glands.

The phagocytic power of the eosinophils in the patient's blood was tested by means of a culture of staphylococcus aureus, and was found to be high. Some activity was present in the case of the eosinophilic myelocytes; about twice as much phagocytic power was displayed by those with a simple, indented nucleus, while the cells with one-, two-, three-, and four-lobed nuclei were found to be the most active phagocytes.

Examination of the Charcot-Leyden crystals led to the following conclusions: (1) The crystals are first formed within the substance of the eosinophil leukocytes; (2) the cells eventually break down, and liberate the crystals, which then grow into larger formations; (3) there is no definite evidence that the crystals primarily arise from the oxyphilic granule of disintegrated eosinophil cells; (4) the conditions leading to the formation of these crystals appear suddenly on the third or fourth day.

The "buffy" coat of coagulated blood taken from the patient displayed no yellowish tint, such as would be expected in view of the hypothesis that the yellow tint of the lymph glands, in lymph adenoma, may be due to the presence of eosinophils.

Nothing definite is known as to the nature and origin of this condition. Two previous cases were associated with cardiac disease, but in a case reported by Stillman there was no evidence of such a condition. The disease is a hyperleukocytosis rather than a leukemia, or is a special type of leukemia. The function of the spleen, in producing the condition

is uncertain. Although in the case here described the blood changes increased following splenectomy, there was no intrinsic change, and no conclusions can be deduced as to the rôle of the spleen.

As far as possible, all the usual causes of eosinophilia were excluded. There was no evidence of bacillary infection.

The authors believe the disease to be due to some condition affecting the bone-marrow, and therefore the eosinophils, which are primarily derived from this tissue. The increase in the formation of eosinophils following operation is probably due to persistence of the primary cause, and also, indirectly, to a loss of phagocytes subsequent upon the removal of the spleen. However, the patient's blood does not appear to be deficient in phagocytic power, as compared with the blood of other individuals. He is not particularly susceptible to local infections, and abrasions heal normally. Theoretically, however, there is a great and increasing strain upon the bone-marrow, due to the increasing eosinophilic hyperplasia, and infiltration, and progressive deterioration of the bone-marrow is to be expected, with consequent risk of secondary infection. The ultimate prognosis is therefore unfavorable in this case. The normal phagocytosis may be due to the fact that the hemolymph glands had already taken over some of the phagocytic activity of the spleen even before the removal of the latter. This would explain the lack of immediate results of splenectomy.

In general, while patients may survive splenectomy without apparent injury to the general health, the strain on the bone-marrow will eventually increase the liability to secondary infection.

In a case reported by Eccles and Freer, in which splenectomy was performed for traumatic rupture, an operation ten years later revealed the presence of a normal spleen, evidently a secondary formation from an hypertrophied spleniculus which was overlooked at the first operation. This would indicate the advisability of leaving intact any spleniculus which may be observed in the course of splenectomy.

While the patient described still continues in good health, some evidence of failing strength is present, and the blood changes are progressing.

Rosenow, G. TREATMENT OF PERNICIOUS ANEMIA. [Klin. Woch., Jan. 1, 1923.]

G. Rosenow reviews the various methods of treatment in pernicious anemia. He concludes that either combined or separately certain results cannot be expected therefrom. Nevertheless some of them undoubtedly prolong life and accelerate the occurrence of remissions of the disease. For general practice three are specially to be recommended: (1) Arsenical treatment; (2) intramuscular injections of small quantities of blood; and (3) treatment by thorium X water. Since Byrom Bramwell first recommended arsenic no better drug has been found in the treatment of pernicious anemia. There can be no doubt that since its use remissions

in the course of the disease have been observed much more frequently than formerly. It is best given by mouth (10 c.c. of liquor arsenicalis are mixed with 10 c.c. of peppermint water in a drop bottle, and 3 drops are given 3 times a day; the dose is increased up to 30 drops of this mixture 3 times a day); the drug should be given on a full stomach, and it should be continued for a long period—several weeks or months. The possibility of toxic symptoms, skin pigmentation, and arsenical neuritis should be borne in mind. But in pernicious anemia the tolerance for arsenic is high. Atoxyl should not be given on account of the risk of optic atrophy. Salvarsan is not superior to inorganic arsenical preparations. The author has treated cases with thorium X and not infrequently obtained results equal to the best obtained by arsenic. Thorium X is of service in some cases when arsenic has failed. It is given in a solution two or three times a week for four to six weeks. The bottle containing the suitable dose should be used immediately because the activity rapidly diminishes. Not infrequently improvement in the blood conditions follows transfusion of normal blood. This can be best performed according to Weber's intramuscular method: 10 to 20 c.c. of blood are taken by means of a syringe from the arm of a healthy individual (free from syphilis and malaria) and injected directly into the gluteal region of the patient. The injection may be repeated later.

Sollier, P., and Morat, D. HEMOCLASTIC CRISES IN DRUG ADDICTS. [*Presse Méd.*, Jan. 10, 1923, XXXI, No. 3.]

Widal's hemoclastic test was found to give positive figures in a morphin and a heroin addict. The test remained positive for from twenty to thirty days after stopping the drug in this patient. A negative result, they infer, is an indication of abstinence. Drug addicts have a hemoclastic crisis after injection of even a small dose of the drug. Therefore a very small injection relieves the severe symptoms after starting treatment, but the drug should never be used later for any reason whatever. The hemoclastic crisis is so widespread a phenomenon it is doubtful whether it is as valuable as indicated.

Csonka, F. A., and Taggart, G. C. ESTIMATIONS OF BLOOD SUGAR. [*Jl. of Biol. Chem.*, September, 1922.]

F. A. Csonka and G. C. Taggart have compared the method of estimating glucose in blood devised by Folin and Wu with that suggested by Benedict. Previous observers have found that Benedict's process yields higher figures than that of Folin and Wu. The authors found that both methods gave accurate results when tested with pure solutions of glucose of the same concentrations as are found in blood. The proteins are removed by picric acid in the method of Benedict and by tungstic acid in the process of Folin and Wu. Since Benedict's methods yield higher figures, it might be thought that tungstic acid precipitates some of the glucose or that the filtrate contains some substance reacting with picric

acid but not with copper. The first hypothesis has been shown to be incorrect by applying the Folin-Wu technique to both the picric acid and tungstic acid filtrates. The results have been practically identical. On applying the Benedict technique to the filtrate after precipitation with tungstic acid, it has been found that it yields higher figures than by the Folin-Wu process of estimation, but less than those found by the method of Benedict for estimating glucose in blood. It is therefore evident that tungstic acid eliminates some of the substances other than glucose interacting with the picric acid used by Benedict for the estimation of glucose in the filtrates.

Holler, G. INFLUENCE OF THE THYROID ON BLOOD PRODUCTION. [Wien. klin. Woch., Jan. 11, 1923, XXXVI, No. 2.]

The average diameter of the erythrocytes in hyperthyroid patients was found by this investigator to be at the upper limits of normal or above. While there are only few polychromatophilic erythrocytes to be found with usual methods, vitally stained corpuscles are more frequent than in healthy persons (several tenths of 1 per cent). The limits of resistance against osmotic influences are broader.

Kramer, B., and Tisdall, F. F. BASES OF BLOOD. [Jl. of Biol. Chem., August, 1922.]

B. Kramer and F. F. Tisdall have measured the concentration of sodium, potassium, calcium and magnesium in whole blood and in the serum derived from it, whence they have determined the distribution of these bases between the corpuscles and the serum. Their estimations have been made on relatively small amounts of human blood. The authors have observed a high degree of constancy in the concentration of sodium, potassium, calcium and magnesium in the serum of normal adults and of children. The proportion of corpuscles in the blood has been ascertained by the use of the hematocrit. The results show that the corpuscles are practically free of sodium and that the corpuscles contain no calcium. The concentration of potassium in human blood corpuscles is constant. About 428 milligrams of potassium are present in 100 cubic centimeters of corpuscles. This is about twenty times the amount found in the serum. From 2 to 4 milligrams of magnesium are present in 100 cubic centimeters of corpuscles. It would thus appear that potassium is practically the only mineral base in human corpuscles. On the average sodium forms 92 per cent of the fixed base present in the serum, the weight of potassium being about double that of the calcium and magnesium together and the weight of calcium being double the weight of magnesium.

Perrin, M., and Hanns, A. ENDOCRINES AND COAGULATION OF BLOOD. [Arch. d. Mel. d. Coeur, September, 1922, XV, No. 9.]

Most of the organs have both a coagulating and anticoagulating action. Perrin found a simple coagulating action in the thymus, spleen, bone

marrow and kidney. A similar but much more intense action was manifested by the pituitary, bowel, lung, skin and ovaries. Similar action of the thyroid may be perhaps due to the internal secretion.

Hess, Alfred F., and Lundagen, Marion A. SEASONAL TIDE OF BLOOD PHOSPHATE IN INFANTS. [Jl. A. M. A., Dec. 30, 1922.]

In view of the seasonal variation of the ultraviolet rays, and in view of the pronounced effect of ultraviolet irradiation on the inorganic phosphate of the blood, it seemed worth while to Alfred F. Hess and Marion A. Lundagen, New York, to determine whether the transition of the seasons leads to periodic chemical alterations in the blood of infants. The infants who were tested were from six to eighteen months of age, living under excellent hygienic conditions, and were on a diet of certified raw milk or of dried milk, as well as the usual amount of orange juice, the older ones receiving cereal in addition. In the summer of 1921, the phosphate content of the blood was 4.34 mg. per cent. In December the average had fallen to 3.92 mg. per cent. Monthly examinations, 329 in all, of about 50 infants, demonstrated a steady decrease in the inorganic phosphate, the lowest ebb being in March. This level would have been still lower had it not been for the fact that whenever the phosphate content was found to be low (3.75 mg.) the child was given either sun treatment or irradiation from an artificial source. In fact, it was found that the blood test furnished a valuable criterion as to when heliotherapy should be instituted. In April the tide began to rise, ascending markedly in May, and rising to almost a normal level during June. The authors suggest that this seasonal tide, with its summer flood and winter ebb, occurs, to a greater or less degree, in most bottle-fed infants living in the large cities. The phosphate tide is not intimately dependent on the variety of milk, it was pronounced when the raw certified milk was fed, although the level was somewhat higher than when dried milk was given. The authors are unable to state how breast-fed infants react to the influence of season; whether they also manifest a tidal blood variation. Judging, however, from the fact that 50 per cent of well nourished breast-fed infants attending an out-patient department have been found to show clinical evidences of rickets at the end of March, it seems probable that they, likewise, are susceptible to seasonal fluctuations. In somewhat older children the variations were found less marked, although definite.

Veiel, W. H. PRIMARY OLIGURIA. (Contribution to the Knowledge of Organic and Functional Disturbances in the Vegetative Nervous System, Especially of Vegetative-Neurotic Edemas.) [D. Arch. f. klin. Med., Vol. CXXXIX, Nos. 3, 4.]

The writer describes certain forms of pathological oliguria aside from the primary diminution of urine resulting from cardiac and nervous diseases or perhaps following the administration of theocin or caffein or hypophysin. A temporary oliguria lasting for several days showing also

oligochloruria and hypochloremia was observed in a woman forty-four years of age with arteriosclerotic contraction of the kidneys in connection with a cerebral eclamptic crisis. The writer discusses two cases of habitual oliguria in vegetative neuroses where it is undetermined whether independent nervous, *i.e.*, primary endocrinous, alterations are responsible as causes. There was evident in one of these cases increased autonomic excitability in the form of bradycardia and lowered blood pressure, also greatly decreased metabolism. There was especially a chronic oliguria as a symptomatic feature of serious changes in the water regulation with tendency to retention of water in the tissues. The author emphasizes this as not constituting a true edema but an enormous swelling out of the whole tissue. Sodium chlorid, especially the chlorin, but also an exclusively carbohydrate diet increase the tendency of the tissues to swell. A certain relief for the swelling and stabilization of the water metabolism could be obtained through ovarian extract but normal conditions were not obtained. In this case and the next there was faulty constitution and defective function of the nervous system though in the second case there was no special neurotic or endocrinous disorder. The patient was a woman forty years of age whose third pregnancy had to be interrupted because of violent vomiting and severe neuralgia. This was followed by severe symptoms of swelling with oliguria accompanied by marked lassitude. Other Basedowian symptoms led to the administration of KI in very small doses (KI 1.0:200.0, 1 gtt. daily), with the result that diuresis was being gradually established. One g. calcium chlorid given intravenously in a 10 per cent solution had also a diuretic effect acting particularly favorably upon the excretion of sodium chlorid and nitrogen. [J.]

Hansen, I. PERNICIOUS ANEMIA AFTER ROENTGEN TREATMENT. [Uges. f. Laeg., Nov. 23, 1922, LXXXIV, No. 47.]

After a course of roentgen treatment an acute pernicious anemia may develop. The causal connection seemed unquestionable although pre-existing achylia may have afforded a predisposition. The patient was a woman, aged thirty, who had been under treatment for hyperthyroidism at intervals during several years.

Ellermann, V. AVIAN LEUKAEMIA. [Ugeskrift for Laeger, Feb. 26, 1920.]

In this paper is described various forms of leukemia in hens—that is, a lymphatic, a myeloid, and an intravascular lymphoid form—some of the cases in the last class including purely anemic forms. In February, 1917, Ellermann acquired a live hen from which he has been able to reproduce the disease in twelve successive generations. It was found that the virulence of the disease, as shown by its increasing brevity, was augmented by successive inoculations. This increased virulence did not, however, affect the frequency with which inoculated hens proved immune;

throughout these experiments 60 to 70 per cent of them did not develop the disease. As with other strains he has experimented on, the author found that this strain, too, gave rise to more than one form of leukemia; thus, myeloid and intravascular lymphoid disease were provoked, and in one case the disease assumed the lymphatic form. In the case of the intravascular lymphoid form, the hemolytic action of the serum on the erythrocytes of rabbits was reduced; this was not the case with the myeloid form. Immunity to the disease could not be induced by the subcutaneous injection of virulent material containing the filtrable virus. Inoculation of hens with the blood of human beings suffering from leukemia gave negative results.

Hahn, F. EOSINOPHILIA IN CHILDREN. [Zeits. f. Kinder., Nov. 17, 1922, XXXIV, No. 1-4.]

The frequency of eosinophilia (over 6 per cent) in children is explained by this author as due chiefly to the great instability of their blood, and the frequency of the exudative diathesis, and of infections (including intestinal parasites). He found an increase in eosinophils in diphtheria, and attributes it to the injections of antitoxic serum.

McGavran. THREE CASES OF LEUKEMIA IN ONE FAMILY. [Am. Journ. of Med. Sciences, October, 1922, CLXIV, No. 4. J. A. M. A.]

Of the three cases reported by McGavran one case was of the myelogenous type and two cases were of the lymphatic type. The patients were males. In addition to the leukemia there were in this family three cases of epilepsy, two known deaths from tuberculosis, a case of apoplexy and several deaths from heart disease.

Bachmann, George. DISTRIBUTION OF THE VAGUS NERVES TO THE SINO-AURICULAR JUNCTION OF THE MAMMALIAN HEART. [The American Journal of Physiology, Vol. LXIII, January, 1923, pp. 300-337.]

The heart beat originates, in cold blooded animals, in the sinus venosus. While in adult mammals the sinus venosus does not exist, recent investigations have shown that remains of this chamber are carried over from embryonic life into the fully developed heart. This remains is located at the junction of the superior vena cava with the right auricle and is called the sino-auricular node. It is probable that other remains of this chamber exist elsewhere along the sino-auricular junction, and some evidence is given in support of this belief. Since the beat originates normally in the sino-auricular node, it is logical to suppose that any change in the activity of the heart must be brought about by changes in the tissue in which the beat arises. This reasoning has been shown experimentally to be correct for the cold blooded heart, in which the relation of the vagus nerves to the group of ganglia located at the sino-auricular junction has been definitely established. This could not be said of the relation of the vagus nerves to the corresponding region of the

mammalian heart, and it was the problem which the author set himself to solve.

The exact location of the nerve ganglia of the dog's heart was first determined by a microscopic study of the sino-auricular junction. The areas known to contain the ganglia were then destroyed in varying rotation in a number of animals by means of a coagulating fluid. In order to establish the relation of right and left vagi to the ganglia experimented upon, these nerves were stimulated before and after the destruction of the ganglia while the heart's action was being recorded by the optical method of Frank. From the permanent records, the loss of inhibitory influence of each vagus nerve was computed in terms of percentage. These experiments were repeated in another series of animals by means of a local application of a solution of nicotine, this poison having the power of preventing temporarily the passage of nerve impulses from the terminals of the nerve fibers to the ganglion cells. The following conclusions were reached:

Ganglia in relation with the vagus nerves are found throughout the sino-auricular junction of the dog's heart. These ganglia occur in five groups: (1) a superior caval group, on the median side of the superior vena cava; (2) a group adjacent to or coterminous with the head of the sino-auricular node; (3) a group, similarly situated, in reference to the tail of the S-A node; (4) an intercaval group penetrating a certain distance into the tubercle of Lower; (5) a coronary sinus group in the tissue between the mouth of the coronary sinus and the limbus of the fossa ovalis.

These various groups of ganglia are related to both vagi. Average computations, based on the effects of destruction of these areas by a coagulating fluid and on the effects of the application of nicotine, show that the left vagus is predominantly distributed to the superior caval ganglia; that the same relationship obtains for the ganglia of the head of the S-A node; that the intercaval ganglia are predominantly supplied by the right vagus; that the same right vagal predominance holds true for the ganglia of the tail of the S-A node; and, finally, that the left vagus predominates in its distribution to the coronary sinus ganglia, this nerve being, in the majority of instances, the only one to be distributed to these ganglia. The primary destruction of the area of the coronary sinus containing the ganglia is not followed by any disturbance of the atrio-ventricular conduction. It would seem that the inhibitory effect of the left vagus may be in part exercised on the sinus tissue of this area. In any event, there is no valid reason, either phylogenetically or functionally, for assigning this tissue to the atrio-ventricular node. The customary greater inhibitory power of the right vagus is directly related to its more extensive distribution to the ganglia of the sino-auricular node. In those instances in which the left vagus fails to produce complete inhibition its percentile distribution to the ganglia of the S-A node and to the superior

caval ganglia is less than in those instances in which it produces complete inhibition. Great variability is exhibited in the percentile distribution of both vagus nerves in different animals, the average order of predominance being sometimes reversed in individual cases. [Author's abstract.]

2. ENDOCRINOPATHIES.

Buschke, A., and Peiser, B. ENDOCRINE LESIONS OF TADPOLES FROM THALLIUM. [Klin. Woch., Oct. 14, 1922, I, No. 42.]

An experimental research which indicates that thallium inhibits the rate and capacity for growth and metamorphosis of tadpoles. Thymus and thyroid can overcome this action only partially. Thallium has some poison properties to the chief determiners of development.

A NEW REVIEW OF ENDOCRINOLOGY. [Paris Letter, J. A. M. A.]

A new periodical, the *Revue française d'endocrinologie*, to be published under the direction of Professors Lucien and Parisot and Dr. Richard (Nancy), has been announced. This review will appear every two months. The first number will contain, among others, an article by Prof. Gley on the history of endocrinology in France, an article by Prof. J. Sabrazès (Bordeaux) on senile dementia and lesions of the suprarenals, and a contribution by Dr. Mauclair on grafts of endocrine organs.

It is to be hoped that this publication will be able to make a judicious choice in the somewhat encumbered domain of endocrinology. In this field, possibly more than anywhere else, really serious things should not be confused with trivial matters, but that is just what has happened to the *Vie médicale*, which names as the official organs of organotherapy *Endocrinology* and a certain pseudoscientific publication emanating from an American laboratory and sent out in profusion to the physicians on the continent. It is true that the director and proprietor of this laboratory was recently in Paris and was able to gather at a dinner several eminent members of the medical profession, who also took seriously what was not of any particular moment. A recent number of the *Gazette des hôpitaux* contains a letter from the United States, in which Dr. Faxton E. Gardner (New York) makes this statement: "There is a certain laboratory in the United States, which is flooding, copiously and frequently, the physicians of the continent with pseudoscientific propaganda in the interest of their numerous organic products with which all diseases may be treated and cured. It would almost seem as if the human organism were a mechanical device animated or propelled by a group of glands only one of which need be touched in order to unleash the desired effect. The physician, like the electrician standing near an electric display, needs only to push the proper button that is

applicable in the particular case with which he is dealing. One may thus arrest a diarrhea, change a feeble-minded child into a wide-awake pupil, or give renewed youth to those who have become enfeebled with age."

Curschmann, H. UNDERNUTRITION AND ENDOCRINE DISTURBANCES. [Acta Med. Scand., Nov. 29, 1922, LVII, Nos. 2-3.]

From a large experience with underfed people during and following the war this author makes a distinction between hypothyroid edematous states and undernourishment edematous conditions. Undernutrition increased gastric hyperacidity in the asthenic individuals and increased achylia in the asthenic. Diabetes as well as exophthalmic goiter occurred less frequently during the war in the populations not immediately exposed.

Fleming, G. B. INFLUENCE OF GROWTH ON BASAL METABOLISM OF CHILDREN. [Am. J. of Dis. of Child., Feb., 1923, XXV, No. 2.]

The high basal metabolism of the growing child it is here suggested may to some extent be accounted for by the active energy metamorphoses incident to the anabolism of new tissue formation.

Vollmer, H. HORMONES ON METABOLISM. [Jahrbuch für Kinderheilkunde, Vol. XCIX, Nos. 2-3, p. 133, J. A. M. A.]

Vollmer fed or injected thyroid, parathyroid, suprarenal, thymus, pituitary or ovarian preparations in a large number of infants, and tabulates the metabolic findings thereafter. The research was done during the winter and stopped with the opening of spring as the metabolism is always speeded up during the early days of spring. The elimination of acid in the urine was reduced by all these treatments except parathyroid treatment, which increased it. He assumes from this research that all these organs, except the parathyroids, stimulate the metabolism, while the parathyroids depress it. This sustains the importance of the endocrine system in the pathogenesis of rachitis and tetany. A pathogenetic connection is further sustained by the hormonal spring crisis of the two diseases. The exogenous factors of each may influence the endogenous factors further. Tetany is liable when the metabolism tends to alkalosis; rachitis, when the trend is to acidosis.

Blumgarten, A. S. THE POSITIVE ACHIEVEMENTS OF ENDOCRINOLOGY. [Endocrinology, Vol. VI, No. 6, November, 1922.]

The author discusses the positive achievements of endocrinology in the last thirty years. While conscious of the negative data, he stresses the positive facts. He discusses them principally from the clinical standpoint.

He divides the positive achievements into four categories: (1) The advances made in the elucidation of the specific endocrinopathies; (2) the advances made in the relationship of the ductless glands to non-

specific disease, such as medical diseases, diseases of the nervous system, etc.; (3) the advances made in the relationship of the ductless glands to gynecology; (4) the relationship of the ductless glands to public health; (5) organotherapy.

He considers as established facts only those that have stood the test of time, both in the laboratory and in the clinic, and he does not accept the questionable data. Under specific endocrinopathies, he discusses myxedema, cretinism and hyperthyroidism, and lays stress upon the value of basal metabolism as a diagnostic measure in these conditions. He also emphasizes the occurrence of visceral symptoms that frequently dominate the clinical picture in hyperthyroidism. He discusses disturbances of the autonomic nervous system in relation to hyperthyroidism, but states that vagotonia and sympathicotonia as distinct entities are rare, the usual condition being all sorts of variations of these states, temporary states of one or the other, or both, and the presence of both vagotonia and sympathicotonia at the same time.

Under pituitary syndromes he discusses the recognition of pituitary tumors and the Froehlich syndrome, etc. In the case of pituitary tumors he suggests the indications for operation, and in the Froehlich syndrome he does not think objective results, such as reduction in weight and genital development, can be obtained with pituitary therapy. He believes that, in most instances, the genital under-development is a retarded puberty and that the reported objective results from pituitary therapy may be accounted for in this way. He does believe, however, that pituitary therapy is distinctly useful in the relief of so-called pituitary headache associated with abdominal crises, but the dosage for these conditions is a very variable one and is more effective in females than in males. The author discusses adrenal cortical tumors, Addison's disease, and the relationship of the adrenal cortex to hyperthyroidism. With reference to the thymus gland, he believes that little is known other than its presence in childhood, the secondary gonadal deficiencies and its method of compensation. Under the pineal gland he mentions the generally accepted syndrome resulting from tumor, but thinks that the reports of treatment of mental deficiency with this substance must still be considered critically. Under gonads he discusses the relationship of their internal secretion to the secondary sex characteristics and the physical and psychical characteristics of eunuchoidism and the symptoms resulting in the artificial and natural menopause.

Under the pancreas he discusses the internal secretion of the islands of Langerhans and lays stress on the isolation of insulin as an outstanding accomplishment in endocrinology. He mentions the ability to reduce hyperglycemia experimentally by partial thyroidectomy after a partial pancreatectomy. In regard to the parathyroid glands, he discusses tetany, the relationship of the parathyroids to calcium and acid base metabolism, and he mentions the occurrence of tetany (in

experimental conditions) in the presence of protein putrefaction. This he believes casts some doubt on the parathyroids functioning by hormone production. He discusses glandular interrelationship. Under nonspecific disease, he discusses the relationship of the ductless glands to growth, development and disturbances in physiology. In connection with disturbances in growth and development he points out cretinism, juvenile myxedema, the Froehlich syndrome and genital deficiency as factors in determining the pattern of growth and the type of mental development. Under disturbances of physiology, he discusses disturbances of the ductless glands as causative factors in various functional diseases, such as neuroses, joint symptoms, gastric symptoms, etc. He lays stress on the isolation from the group of functional diseases of specific syndromes occurring in some of the definite endocrinopathies, such as the functional pituitary syndrome, hyperthyroidism, etc. In disturbances of the autonomic nervous system, he emphasizes the variability of the clinical pictures as they occur. Under constitutional medicine he discusses the relationship of the ductless glands to medical anthropology, indicating that the frequent occurrence of the Froehlich syndrome and the eunuchoid type suggests the classification of individuals according to various types which may not be attended by any functional or organic disturbances. On the other hand, he mentions the occurrence of specific functional disturbances in some of the types. The relation of the ductless glands to neurology is discussed from the standpoint of the functional and developmental relationship of these glands to psychical manifestations, to dementia precox, to neurasthenia, to homosexual tendencies and also the relationship of the ductless gland to psychoanalysis. He states, however, the need for careful study to determine the fundamental relationships between physiologic psychology and the ductless glands. The relationship of the ductless glands to gynecology is discussed and the importance of the study of the patient from this angle in functional gynecological disturbances is pointed out, because of the apparent relationship between ovarian function and the function of other ductless glands and the frequent occurrence of functional gynecological disturbances in primary diseases of the ductless glands. The recognition of incurable sterility as a manifestation of ductless gland disturbance is pointed out and the inefficacy of treatment when this condition is not recognized. The author also points out the contributions of endocrinology to public health and eugenics, in the preventive treatment of goiter and the inadvisability of marriage in the types of individuals with marked primary or secondary genital deficiencies. The author discusses organotherapy and indicates that the fundamental basis for this form of treatment is the appreciation of myxedema and cretinism, and the specific results obtained by thyroid feeding, which suggested the possibility of similar treatment of other endocrinopathies by means of the respective glands. At the present time, however, the problem lies in the ability

to recognize specific deficiencies and the administration of effective substances. He summarizes the definite effects as follows: Thyroid extract and thyroxin are specific in the indicated cases. Pituitary extracts are useful in relieving the functional symptom in pituitary syndromes, such as pituitary headaches and associated symptoms and some of the functional menstrual disturbances; but the effect of these substances in modifying the anatomical characteristics of these syndromes is distinctly questionable. The dosage is variable and varies with sex. Ovarian extracts have a logical use in artificial or natural menopause symptoms, but the results must be considered critically. Corpus luteum and ovarian extract, injected intravenously, are useful in checking psychical and nervous manifestations at the menopause. The use of organic products in functional gynecological disturbances is only effective when the above specific indications can be recognized. The effect of adrenal cortex and adrenal residue in hyperthyroidism seems to be encouraging, but it still awaits proof. Testicular and orchic extracts have logical indications, but no definite effects. The same is true of thymus extract. Parathyroid extract has not yet given definite results. The author discusses the specific pharmaceutical products obtained from the ductless glands, such as epinephrin, pituitrin, thyroxin, and recently, insulin, and emphasizes their specific, definite pharmacologic effects. He discusses pluriglandular therapy and states his belief that it is highly illogical and unscientific to use shotgun prescriptions in the hope that the body will pick out those which it needs. He believes that pluriglandular disturbances occur and that several products may occasionally be indicated, but the specific indication should be recognized and the specific products administered.

The author concludes by comparing the status of endocrinology with that of general medicine and he points out that the progress in this branch of medical science compares very favorably with that of other branches. Endocrinology has contributed a better appreciation of many common diseases and has elucidated many specific endocrinopathies. It has contributed a number of specific pharmaceutical products which produce definite effects. He appreciates the shortcomings of endocrinology, which are those of medicine in general and not specific for endocrinology. As far as therapy is concerned, he states that the shortcomings of organotherapy, or therapy along endocrine lines, is merely in line with the shortcomings of therapy in general. There are very few drugs that have specific results, and in the short time that the acute interest in endocrinology has been aroused, it has contributed more than its proportionate share to general medicine and to therapy. He concludes by stating that it is a subject worthy of serious investigation by clinicians and laboratory workers. He indicates that the opportunities in the clinic are just as great as those in the laboratory. [Author's Abstract.]

Imre, J. THE INFLUENCE OF THE ENDOCRINE SYSTEM ON INTRAOCULAR TENSION. [Endocrinology, March, 1922.]

The author states that the normal intraocular tension estimated by the tonometer of Schiötz is between fifteen and twenty-six millimeters of mercury pressure, and when the heart stops beating it sinks to eight millimeters. Since 1910 the author has been making systematic observations with the tonometer, particularly in pregnant women. A remarkable case tested by him three years ago was a pregnant woman who showed signs of osteomalacia. Her intraocular tension was less than that of a cadaver, being even less than five millimeters. Among fifty gravid women forty-two had decidedly subnormal tension, two normal, and six high tension. Those with hypotension showed signs of pregnancy in face, hands, skin, and elsewhere, these being regarded as due principally to hyperpituitarism. Those who had hypertension looked unusually fresh and showed no facial signs of pregnancy. Intraocular tension was also found in connection with pituitary tumor. In one such case the pathological process had been arrested by X-ray treatment and by a course of thyroid medication. Here tension was perfectly normal. Two untreated patients with osteomalacia had decidedly low eye tension. Of three castrated patients, two were much better as a result and these had normal tension, while the other failed to show improvement and had a subtension of twelve millimeters in both eyes. With the two who were benefited a difference of tension (23 as against 15, and 18 as against 15) remained between the eyes, a remarkable finding, since the rule is that both normal eyes in any given subject have the same tension. Hippel has found that patients with glaucoma give a positive Abderhalden reaction with thyroid and thymus. From his own observations and from the literature the author concludes that the tension is quite labile in goitrous and other thyroid patients. He finds, as a result of his studies, that a disturbance in the balance of the endocrine system causes a disturbance in intraocular tension. When the balance is restored, the intraocular tension approaches or becomes normal. Although we usually have to do with a pluriglandular disturbance, the glands that play the principal rôle in the regulation are the pituitary, thyroid, thymus, and gonads.

Tallqvist, T. W. UNDERNOURISHMENT AND INTERNAL SECRETIONS. [Act. Med. Scand., 1922, LVI, No. 6, J. A. M. A.]

Tallqvist bases his statements on 13,000 patients under observation between 1912 and 1922, charting the prevalence of diabetes, exophthalmic goiter and gastric achylia. His chart unmistakably demonstrates the antagonistic influence on these diseases of the food scarcity during the war. All his data sustain the assumption that the internal secretions are peculiarly sensitive to lack of adequate nourishment. The benefit from fasting in diabetes has been ascribed to the favorable influence on the sugar metabolism. But he thinks we are justified in going back

of this to the fact that undernourishment depresses the functioning of the whole hormonal system. The benefit in exophthalmic goiter from the undernourishment of the war years suggests a prophylactic and therapeutic influence on this disease from systematic dieting. Testimony is accumulating that a constitutional predisposition is an important factor in both diabetes and exophthalmic goiter, and the war experiences seem to indicate that undernourishment materially reduces this predisposition. The article is in German, and cites Riesman's article in *The Journal*, June 15, 1912, p. 1846.

Vincent, S. CURRENT VIEWS ON INTERNAL SECRETION. [*Lancet*, Aug. 12, 1922, Vol. II, No. 5163, p. 313.]

This author returns to his well known critical attitude. Admitting that there is no objection to the investigation of the activities of tissue extracts, so long as the investigator realizes that the results are in themselves only of pharmacologic interest, Vincent says it is only when several other lines of research have been explored that conclusions about an internal secretion may be drawn. Furthermore, it is still desirable to point out that the term "internal secretion" has been used too generally and too confidently. Knowledge of internal secretion is not yet even remotely comparable in accuracy and definiteness with knowledge of "external" or ordinary glandular secretion. With the exceptions of the various preparations of the suprarenal bodies, the thyroid and pituitary bodies, these animal substances have not been shown to possess any specific characters or to exercise any definite physiologic action on the economy. Their continued and indiscriminate exploitation constitutes one of the worst forms of present-day quackery. Manufacturing druggists, Vincent continues, are not the only, nor, indeed, the chief offenders in this matter. They after all only push upon the market what they are likely to be able to sell, and their prospect of sale depends on the recommendations of physicians. It is the physician's duty, therefore, to be much more critical in drawing conclusions from an apparent beneficial effect of the administration of extracts of organs and tissues. This is all the more necessary when more than one kind of substance is given at one and the same time. It is sometimes urged that the body will pick out the substance it needs and will discard the others. This kind of argument has influenced therapeutic practice throughout the ages, but it is of doubtful value and needs the check of careful observation. There is a special need of great caution when the substances are administered by the mouth. With the exception of those from the thyroid, it is very doubtful in Vincent's opinion whether any of the organic preparations have any action, physiologic or therapeutic, when given in this way. He urges that if the subject of internal secretion, in both its clinical and its physiologic aspects, is not fall into utter disrepute, it must be treated with infinitely more of scientific discrimination than has hitherto been the case. The ordinary criteria

of evidence must be duly regarded, and workers in all fields must realize the necessity for adequate and rigid control experiments.

Uno, T. GENERAL EXCITEMENT, FIGHTING AND DUCTLESS GLANDS. [Am. Journal of Physiology, Vol. LXI, No. 2, p. 203.]

This is an experimental research during which the metabolism of albino rats was studied in connection with certain behavior reactions. Forty-one male albino rats were stimulated to fight for from one to six hours. Modification in weight, water content and action of the extracts of the thyroid, suprarenals and hypophysis were then examined. The thyroid and the suprarenals showed no reactions. The hypophysis was after from three to six hours' stimulation and fighting, increased in weight.

Papastratigakis, C. DYSTROPHIC SYNDROME. [Paris Médical, Nov. 25, 1922, XII, No. 47.]

Papastratigakis describes a man aged twenty-two with total alopecia, cataract of the right eye, and trophic lesions of the finger nails. He regards it as a new dystrophic syndrome.

Landsteiner, K., and Edelman, A. POLYGLANDULAR INSUFFICIENCY. [Frankf. Zschr. f. Path., Vol. XXIV, No. 2.]

The authors report a case of a seventeen year old girl of little intelligence, apathetic in nature. Further clinical signs were dry skin, absence of hair in the axillae and on the mons pubis, amenorrhea, strikingly small thyroid, horizontal nystagmus, pain in the legs which had been present for a year so that she could neither walk nor stand, though no nervous or muscular cause could be assigned to it. The panniculus adiposus was well developed especially in the mammary and hip regions. Later there were fever and icterus. Death came during coma. Autopsy revealed pathologic changes in only one endocrinous gland, the thyroid, although there was also distinct cirrhosis of the liver. The thyroid was very much atrophied (8.5 gm.) with marked increased of connective tissue. The writers believe that the diseased condition of the thyroid alone can present all the marked anatomic changes to be found in "polyglandular insufficiency" and that the condition of the liver here depended upon the same etiology as that of the thyroid condition. They believe that the osteomalacial bony changes depended largely upon the bad nutritive conditions, but that the disturbances of the inner secretions caused a poorer development of the bony tissue than with other individuals. [Author's Abstract.]

Claude, H. CONGENITAL PREDISPOSITION IN PLURIGLANDULAR INSUFFICIENCY. [L'Encéphale, 1922.]

"We have considered," the writer says, "this disposition as favorable to the alteration of certain glands under the influence of the toxic-infectious process." He cites the works which have directed clinical

thought to this subject, those of Wiesel, Wiesel and Goldstein, J. Bauer, Krabbe, Kushmann. He gives a rapid analysis of two studies of the last named writer and reports the case of a man forty-seven years of age who at about the age of twenty-six found his genital power diminishing. His genital organs were little developed, his hair scanty, his voice shrill and he presented besides a parotid hyperplasia. Claude insists upon this last symptom as very frequent in the syndrome of pluriglandular insufficiency associated sometimes with hypertrophy of the lachrymal glands. The author gives at the end a classification of these syndromes from the etiologic point of view: (1) a. Syndrome associated with a manifest exogenous cause (infection, intoxication): Appearing upon a normally constituted disposition; (b) syndrome from an unknown exogenous cause; appearing upon a normally constituted disposition; (2) syndrome of puberty manifested upon a foundation predisposed by previous endocrinous debility; (3) congenital pluriglandular syndrome manifesting itself in a precocious or retarded manner. Generally the authors who have treated the question have not sufficiently taken account of hereditary tuberculosis and of syphilis precox either one developed at a very early age. These are causes which especially ought to diminish, in the statistics, the number of congenital syndromes. One should try to ascertain the origin as recent or old by opotherapy at the period when the troubles make themselves known. Only the organs actually affected will react to opotherapy while congenital or very ancient malformations are insensible to the secretions which have been interfered with. [Author's Abstract.]

Garcia de Quevedo, L. ENDOCRINE GLANDS IN TROPICAL PATHOLOGY. [Porto Rico Medical Ass'n Bulletin, Vol. XVI, No. 136, p. 65, J. A. M. A.]

García de Quevedo remarks that well defined diseases of endocrine origin, such as Addison's disease, exophthalmic goiter, acromegaly, etc., are rare in Porto Rico. On the other hand, abnormal functioning of endocrine glands is a frequent confusing element in tropical pathology. Giantism is rare in Porto Rico, but dwarf growth is frequent. Among the 17,000 drafted men examined for the World War, very few were over 5 feet 10 inches, and many failed to reach the army minimum of 5 feet 4 inches.

Wagner-Jauregg. ORGANOTHERAPY IN NEUROSSES AND PSYCHOSES. [Wien. klin. Woch., Jan. 4, 1923, XXXVI, No. 1.]

This clinical paper is one of general therapeutic optimism consistent with this well known investigator's general attitude and enthusiasm in therapeutic efforts. Thyroid should be used, he says, in every case of retarded development of children. Pituitary tumor combined with hypothyroidism may be helped by thyroid. Even the hemianopsia may be influenced. Dementia precox he conceives of as a heterogeneous group.

The use of thyroid and sex gland has sometimes a favorable influence in the early stages of the hebephrenic type. Careful analysis of dysfunctioning is necessary to determine. Recovery seemed to follow treatment by thyroid and gonads only in girls in whom the psychosis started at puberty and was accompanied by definite somatic signs of a defection primary or secondary sex development. Good results were obtained in neurotic girls with hypoplastic uterus who started to menstruate very late.

Blumgarten, A. S. ENDOCRINES IN COMMON MEDICAL DISEASES. [Med. Clin. N. America, 1921, IV, 1437-82]

Blumgarten emphasizes the rôle of the thyroid and adrenal glands in *gastric neurosis* associated with disturbances in the gastric secretion, and classifies such cases into the following three groups: (1) Cases which show definite signs of a mild form of hyperthyroidism or thyroid deficiency. (2) Cases in which the gastric symptoms are the earliest manifestation of a hyperthyroidism or a hypothyroidism, which subsequently develops into the classical syndrome. (3) Cases which show the characteristics of the domination of the adrenals or of the thyroid. According to Crohn and Reiss, of the Mount Sinai Hospital, New York, who made fractional tests on fifty cases, gastric hypersecretion is a functional disturbance of the secretory apparatus of the stomach and not a disease *per se*. It is a frequent symptom, occurring most commonly in males, and is present in probably 10-15 per cent of all persons with gastric complaints. Its occurrence is independent of the acidity titre of the stomach; it is found more often associated with hyperacidity, but may occur in all grades of acidity, even in achylia gastrica. Most of the cases of hypersecretion are of the continuous type, lasting throughout digestion and the interdigestion period. The most severe type of cases, which are accompanied by vomiting, emaciation, thirst, epigastric pain, etc., constitute Reichmann's disease. Of the milder grades of hypersecretion about one-third are due to ulcer, and the rest are due to abnormal nerve irritation, either reflexly from abdominal disease or other organs, or from neurotic instability, such as vagotonia, psychoneurosis, etc. A few cases are due to diseases of the central nervous system, hysteria, psychic causes, etc.

Hochstetter, F. MULTIPLE SCLEROSIS OF ENDOCRINE GLANDS. [Medizinische Klinik, Vol. XVIII, No. 21, p. 661.]

A careful pathological study of a generalized disease in which the endocrine system was specially investigated. The clinical history was that of a young farmer of thirty-eight, previously healthy. Intense thirst, sleeplessness, headache and impotence were the initial symptoms. Chronic bronchitis and emphysema followed. At the fourth year, pains suggesting polyneuritis, and extreme weakness, apathy and emaciation dominated the clinical picture, with low blood pressure, polydypsia and

polyuria, but the urine was free from albumin and sugar. Death occurred from heart weakness at the end of six years. Autopsy showed that the thyroid, testicles and suprarenals were sclerotic; the parathyroids and pituitary were sclerotic and atrophied, and the spleen, kidneys, liver and lungs were more or less indurated.. He erects a new disease type. The fact that excessive thirst was the first symptom, and that the pituitary showed the most advanced changes suggests that this gland was the first affected.

II. SENSORI-MOTOR NEUROLOGY.

1. CRANIAL NERVES.

Heyninx, A. THE SENSE OF SMELL. [Quarto, Brussels, 1922. Ed. B. M. J.]

The possession of a sense of smell is one of our natural gifts, but the possession of any knowledge concerning that sense belongs to few. Owning to the inherent and obvious difficulties of the matter investigations have been relatively scanty. Yet the literature of neglected subjects such as this is, none the less, not barren. Various attempts have been made to classify odors and to explain the mechanism by which they reach our consciousness. Of classifications of smells the simplest, and that which will most appeal to the average man, is that of Haller, who in 1763 made them into three classes—Agreeable smells, intermediate smells, and disagreeable smells. So might Falstaff himself have described smells, and by this rule our public authorities work to this day—to our great profit.

In more recent years valuable contributions have been made by Zwaardemaker, whose work created considerable discussion, and whose olfactometer, described in our columns many years ago, opened up wider fields for research. In a thesis recently presented to the University of Brussels, A. Heyninx, in a handsome and well-documented quarto, attacks the problem anew. Zwaardemaker had done a service in reducing the somewhat vague sense of smell to something measurable and capable of clinical application. He had classified odorivectors, and had shown, moreover, that in the same class of odoriferous bodies identical or similar intramolecular groupings are found. But the chemical formulae may vary greatly, and yet a similar smell result—for example, hydrocyanic acid and nitrobenzol have the same odor of bitter almonds. Heyninx attempts to put the olfactory sense upon a rigid physical basis. In the first place, he laments that we can only speak of smells by periphrasis—by comparing a given smell with that emitted by some well-known object. Before the discovery of the monochromatic elements of the solar spectrum it was by such roundabout means that colors were designated. Indeed, Heyninx wishes to set up a spectrum, as it were, for smell with a classi-

fication dependent on variations in the wave-length. By ingenious and closely reasoned argument, betraying considerable knowledge of physical chemistry, Heyninx arrives at the conclusion that the activating mechanism of odors is by the vibration of wave-lengths, the same as those of the ultra-violet part of the solar spectrum. He is attracted by Castelli's theory of resonance in vision—the resonance of the retinal pigment granules in response to waves of light. He uses this theory to explain the pigmentation of the olfactory mucous membrane, and finds that the size of the pigment granules corresponds roughly with the wave-length which odorous bodies emit. An important argument in this connection is contained in a paper by Ogle on anosmia; he states that albinos, who have no olfactory pigment, have no sense of smell. Heyninx describes his experiments on the excitator mechanism of olfaction; they show that it is not a radioactive energy, nor a chemical, nor a colloidal, nor a spectral absorption, but a moleculovibratory energy which activates our affective paths. Dr. Heyninx's contentions are deserving of attention, and his large and extremely well produced book will be found a mine of information with a rich bibliography.

Strebel, J. INJURY OF THE RETINA BY THE SUN. [Schweiz. med. Woch., December 21, 1922, LII, No. 48.]

This report shows that blue glasses do not protect the retina from the direct action of the sun's rays. The patient reported upon observed an eclipse of the sun through deep blue glasses. A severe retinitis with blindness resulted which was a permanent condition.

Moorhouse, V. H. K. RETINAL REFLEX IN FROGS. [Am. Jl. of Phys., January, 1923. LXV, No. 2.]

The pathways of the retinal reflexes are here studied from the phyletic viewpoint. Frogs were used. The average reaction time of the retinal reflex is shortened if the cerebrum is removed. The optic tectum contains most of the pathways.

Demaria, E. B., and Layera, J. RETROBULBAR OPTIC NEURITIS. [Rev. d. l. Assoc. Méd. Arg., November, 1922.]

Posterior sinusitis is here discussed in its relation to retrobulbar neuritis. The whole subject is taken up from the standpoint of evolution, symptomatology and treatment. Free drainage of the sinuses into the nose may be necessary.

Wright, R. E., and Barnard, T. W. RADIOGRAPHY IN OPTIC ATROPHY. [Brit. Jl. Ophth., March, 1923.]

The value of complete radiographic analysis is brought out for cases of optic atrophy in which the cause is at all doubtful. Many cases of pituitary disease, or of disease of the fossa eventually involving the hypophysis, show optic atrophy as the only obvious sign. Notes of five

cases are given, in two of which the clinical evidence was typical, whilst in the other three the optic atrophy so overshadowed all other symptoms that without radiography the cause might easily have remained undiagnosed. It is the ophthalmologist who, in the majority of cases of hypophyseal implication, is first consulted, and the high percentage of such cases which show but slight glandular symptoms renders it all the more impossible to be certain of the cause without the evidence afforded by radiography.

Hardy, W. F. LIPEMIA RETINALIS. [Archives of Ophthalmology, November, 1921.]

In diabetes, pregnancy, chronic alcoholism, diseases of the liver, nephritis, malaria, tuberculosis, cholera and phosphorus poisoning, lipemia may occur. In normal blood the percentage of fat varies from 1^0_{∞} to 3.25^0_{∞} ; in *lipemia retinalis* it varies from 10 per cent to 26 per cent. The author's patient, a white man, aged 29, complained of a skin condition which was diagnosed as xanthoma. He had sugar in his urine and 9.5 per cent of fat in his blood. Eye examination revealed *lipemia retinalis*. The color of the retinal vessels has been described as salmon; the author describes his as greyish white or like malted milk. The color depends upon the light used, the amount of fat present, and the background. The veins and arteries look alike as flat ribbons twice their normal width. As the patient improved the fundus picture returned to normal in two weeks. *Lipemia retinalis* produces no pathological changes in the eye, but, of course, the diabetes may. In lipemia the plasma becomes opaque and visible, consequently the vessel appears double its usual calibre.

Lagrange. HEREDITARY OPTIC ATROPHY. [Arch. d'ophthal, Sept., 1922, p. 530.]

This paper states that it has not been proven that Leber's hereditary optic atrophy is due to defective development of the skeleton (optic foramen, sphenoidal cells) acting mechanically upon the retrobulbar portion of the optic nerve. Fischer has drawn attention to the relations which may exist between the development of the endocrine system and hereditary optic atrophy; but his hypothesis of the mechanical effect by an overgrown hypophysis or an enlarged sella turcica upon the adjacent optic nerve is unsatisfactory. In fact, in this disease the semeiology (white atrophy of the papilla, which is never one of stasis and always preserves its sharp contour with symptoms of retrobulbar neuritis) is clearly a syndrome, the opposite of that caused by intracranial tumors (papillary stasis) and in particular to justachiasmatic growths (temporal hemianopsia). In a case observed by the writer the blood presented a notable anomaly: Retarded coagulation with feebly retractile clot. It is remarkable that this particularity is precisely the stigma of hemophilia;

now hemophilia and Leber's disease are comparable by their common character as hereditary diseases; the retarded coagulation in hemophilia may be considered as a simple stigma rather than a symptom of pathogenic value. Without denying the numerous influences which may favor the occurrence of Leber's disease, in particular the associated influence of chronic intoxication, nor unmindful of the obscurities which surround the pathogeny of this hereditary malady, early endocrine opotherapy deserves a place as a treatment of choice.

Young, G. RELATION OF OPTIC NERVE TO SPHENOIDAL AND POSTERIOR ETHMOIDAL SINUSES. [Brit. Med. J], December 30, 1922, II, No. 3235, J. A. M. A.]

Young examined by dissection the sphenoidal sinuses in thirty subjects. In twenty-seven cases the bone between the nerve and the sinus was so thin, in at least part of its course, that the suture was easily apparent through it. In four specimens there was actually a hiatus in the bone covering the nerve, while in one of these specimens there was more hiatus than bone in the posterosuperior and lateral walls of the sinus—so much absorption had taken place. With regard to the relative size of the sphenoidal sinuses, the intersinus septum was markedly deflected in many cases, making one sinus much larger than the other. This difference in size was sometimes so great that the larger sinus was found to be in relation to the heterolateral optic nerve or cavernous sinus, or both. The actual figures were, that in thirteen cases the sphenoidal sinus of one side was in relation to the heterolateral cavernous sinus, and in nine cases the sphenoidal sinus was in relation to the heterolateral optic nerve. The sclerotic type of sinus was in a very small minority, three cases being in this category, the walls of the remaining twenty-seven being very thin. Ostia in the bone were very commonly found in the lateral wall of the sphenoidal and ethmoidal masses, the boundary between the nose and the orbit. These led into the sinuses, giving passage to numerous blood vessels. Numerous blood vessels were noted occupying these ostia as the lining membrane was stripped from the nasal wall of the orbit. Young believes these facts may be applied to support the clinical evidence that optic neuritis may arise from diseased postnasal sinuses.

Verhoeff. PRIMARY INTRANEURAL TUMOR OF THE OPTIC NERVE. [Arch. Ophthalm., 1922, LI, No. 120, 239.]

Intraneural tumors of the optic nerve as observed in eleven cases are here reported. His conclusions are that the most common tumors of the optic nerves are gliomas—in fact the only primary intraneural tumors of this nerve that have been observed. These tumors are composed of three main types of neuroglia which may grade into one another. Some tumors consist of all three types; rarely does one consist of a single type. Tumors, in which so-called spindle cells predominate, contain the

largest and most conspicuous neuroglia fibers. The spongy structure often displayed by these tumors, which at times has led to a diagnosis of myxoma, myxoglioma or myxosarcoma, is not the result of myxomatous degeneration, but is produced by excessive vacuolization of a neuroglia syncytium. Cysts of various sizes, which also often occur in these tumors, are due to the same process. The tumor is probably essentially congenital in origin and dependent upon some abnormality in the embryonic development of the neuroglia of the optic nerve. The growth stimulates proliferation in all contiguous neuroglia tissue, and thus causes the latter to take on the character of tumor tissue. The theory that tumors of the optic nerve stem are related in origin to neurofibromas of the peripheral nerves is, at present, founded on insufficient evidence, but cannot be dismissed as impossible.

2. PERIPHERAL NERVES.

Linell, E. A. ON SOLITARY FIBROMYXOMATA OF PERIPHERAL NERVE-TRUNKS, WITH A DESCRIPTION OF A CASE OF CYSTIC FIBROMYXOMA OF THE MEDIAN NERVE. [Brit. J. Surg., 1922, X, 202, Med. Sc.]

Linell's case was that of a woman of forty-two, on whose right arm, just above the elbow on the mesial aspect, a painless rounded swelling had been growing for four years. Beyond occasional shooting pain radiating from the mass down into the middle finger there were no symptoms of any kind, and no disability. The tumor was fusiform, of the size of a pigeon's egg, not attached to the skin, and freely movable from side to side, but not in the long axis of the limb. It was painless to touch and elastic in consistence, but not fluctuating. At operation, it was found to be blue in color and cystic, dark fluid blood escaping on incision. In view of its possible malignancy, the median nerve was resected above and below the tumor, and end-to-end suture performed. The fibers of the nerve could be seen spread out on the surface of the tumor. On microscopic examination, the cyst wall was found to consist of a loose network of branching cells, with areas of myxomatous degeneration and of well-developed fibrous tissue. The nerve was free from infiltration above and below the mass, which was therefore diagnosed as a cystic fibromyxoma. The only two similar cases which the author has found recorded are both described in Alexis Thomson's monograph on neuroma and neurofibromatosis (1900). [F. M. R. Walshe.]

Buzzard, E. Farquhar. SENSORY DISTURBANCES IN RELATION TO DIAGNOSIS. [Ed. B. M. J.]

At the seven hundred and first meeting of the Brighton and Sussex Medico-Chirurgical Society Dr. E. Farquhar Buzzard gave an address on the subject of "Pain and other sensory disturbances in relation to

diagnosis." He emphasized the extreme importance of a correct understanding and interpretation of subjective symptoms and expressed the opinion that without this the early diagnosis of many morbid conditions could not be obtained. Accuracy in obtaining a detailed history from any patient was the chief guide towards determining the nature of a lesion however effectively physical signs pointed to its localization. The difficulties connected with obtaining a satisfactory description of symptoms, such as pain, were very great, and the medical man needed as much patience and skill in cross-examination as did a barrister. He was always handicapped by the lack of education in all classes of patients, who had rarely been taught to think clearly or to be conversant with the use or meaning of the language they spoke. Dr. Buzzard illustrated the importance of accurate descriptions in relation to the various forms of headache, and discussed the possible causes which determined the time and incidence of pain in connection with the headache due to gross organic disease as well as that due to anxiety states. He pointed out that while the lay mind might be most impressed by the constancy and persistency of headache, the trained medical mind should really pay perhaps more attention to those forms of headache which were transient and paroxysmal. The importance of other sensory disturbances in relation to diagnosis was illustrated especially by reference to the sensory disorders resulting from early patches of disseminated sclerosis, and emphasis was laid on the fact that slight sensory abnormalities unassociated with any disability or gross objective disturbances of function were always of organic origin and not hysterical. Such symptoms were often of great diagnostic importance and might lead to diagnosis of disease when treatment was most likely to be beneficial. In conclusion, the speaker referred to the various sensory symptoms characteristic of early stages of tabes dorsalis, and pointed out how diagnosis of that disease could be made when the lightning pains were present even in the absence of Argyll-Robertson pupils and other well-known features of locomotor ataxy.

Alexander, W. CRITICISM UPON THE QUESTION OF NEURALGIA. [Zschr. f. d. ges. Neur. u. Psych. Vol. LXXIX.]

The author objects to the too frequent use of the term neuralgia, and the inclusion under it of situations quite distinct etiologically. He discusses sciatica as an example of a condition that probably should be differently defined. Neuralgias are rare. They should comprise only those cases in which the symptomatology belongs entirely to the neuralgia. Alexander makes wide reference to the literature.

Harris, W. MULTIPLE PERIPHERAL NEURITIS. [Lancet, October 21, 1922, II, No. 5173, J. A. M. A.]

The differential diagnosis of polyneuritis, Harris says, is sometimes extremely difficult from acute poliomyelitis and from Landry's paralysis.

The separation from poliomyelitis in some cases is all the more difficult because of the combination of the two conditions that occasionally occurs. Paresthesia and peripheral anesthesia will probably indicate the presence of polyneuritis in a doubtful case, while an extensor plantar reflex will be evidence of cord involvement. Asymmetry of the paralysis certainly does not exclude polyneuritis, and wasting of the intrinsic musculature of the hands is also common in polyneuritis, and retention of the knee jerks is by no means rare. Sphincter paralysis is rare in both poliomyelitis and polyneuritis, but is occasionally met with in both these diseases. The differences in extent of involvement of the sensory nerves, on the one hand, and the motor nerve fibers, on the other, in polyneuritis is remarkable, though not constant for the same toxic cause. Lead is almost purely a motor nerve poison, but diabetes may cause extremely painful local neuritis, or generalized sensory symptoms and ataxy, without any pain. No sensory symptoms whatever occurred in the case of carbon bisulphid polyneuritis seen by Harris. Rheumatic forms of neuritis are usually very painful, so are the alcoholic forms, tuberculous neuritis of the feet, and the neuritis of malignant disease. Hematoporphyrinuric neuritis is also generally painful, though other forms of autotoxemic polyneuritis may show little or no sensory involvement, and may thus be mistaken for poliomyelitis or Landry's disease. A not irrational view, in Harris' opinion, is that which regards polyneuritis and poliomyelitis as essentially the same process affecting different portions of the same neuron, and there can be no doubt that occasionally mixed cases are met with of permanent cord damage, associated with polyneuritic symptoms in which recovery occurs.

Busacca, A. ON THE PHAGOCYTES OF MYELIN IN PARTICULAR EXPERIMENTAL CONDITIONS AND ON THE BEHAVIOR OF THE PHAGOCYTED SUBSTANCES WHEN TESTED WITH FAT STAINS. [Riv. di patol. nerv., XXV, 349, Med. Sc.]

Reference was made to the investigations of this author (*Medical Science*, 1922, VII, 63) on grafted pieces of fixed nerves and their reabsorption through the medium of phagocytes. He has now made some fresh experiments with the object of obtaining further information as to the nature and origin of these cells. The conclusion reached may be summarized as follows: Within grafted pieces of fixed nerves roundish or irregular cells occur which do not essentially differ from those found in degenerating stumps of cut nerves. Such cells are not due to a transformation of the grafted Schwann's cells, but belong to the great category of Maximow's polyblasts and originate either from the blood or from the tissues of the host. They are amoeboid and attack the degenerating myelin and axis-cylinders, fragments of which they phagocyte, thus assuming the aspect of fatty granular cells. The phagocytosed materials undergo the same transformations as described in degenerating

nerves, but in a very slow manner, so that substances stainable by Marchi's method are seen only 30 days after the operation, and substances stainable by Herxheimer's method after 40 days. [C. da Fano.]

MacWilliam, J. A., and Webster, W. J. SENSORY PHENOMENA ASSOCIATED WITH DEFECTIVE BLOOD SUPPLY TO WORKING MUSCLES. [Brit. Med. Jl., January 13, 1923, I, No. 3237, J. A. M. A.]

MacWilliam and Webster investigated the behavior of human muscles temporarily deprived of their blood supply while innervation remained intact; the sensory phenomena recognizable in the states of rest and activity were examined and brought into relation with other functional conditions, such as changes in contractile power, etc. It was found that simple deprivation of blood in the ischemic limb for periods up to twenty minutes caused no great sensory effects, only coldness in the bloodless part, with an inclination to shift the position of the limb, and a certain amount of discomfort from the continued constriction by the obliterating armlet; the absence of pain is to be noted. Muscular action in the ischemic limb soon becomes painful, and when carried to the point of "fatigue" is acutely painful. The pain arises from exercise of a comparatively small amount of muscular tissue—in the presence of an acute lack of blood supply, involving urgent want of oxygen (anoxemia) and its consequences, with excessive accumulation of metabolic products, acids, and other bodies. The authors are convinced that the pain is protective in character, tending to limitation of effort and shielding the muscle from being spurred on to further and injurious activity. These observations have a close bearing on the problems associated with the pain of angina pectoris, and the experiments also have an obvious application to the phenomenon of the condition called "intermittent claudication," as seen in the legs of men and horses, in which muscular exertion is interrupted by attacks of pain, loss of power, coldness of the limbs, etc.

Nyáry, L. CONTRIBUTION TO THE PATHOLOGY OF HERPES ZOSTER. [D. Zschr. f. Nervhkl., LXVIII, LXIX, 242.]

Nyáry bases his discussion of herpes zoster upon the case of a woman suffering from lymphogranulomatosis who was being treated with arsenic and who 13 days after this treatment was discontinued developed herpes zoster on the left side in the region of the cervical dermatomata, II to IV. Examination of C1 to C6 revealed an infarct in the third cervical ganglion of the same side due to thrombosis of a small artery. The soft membranes of the spinal cord all the way from C1 to C6 showed increased infiltration of perivascular spherical cells no more marked at C3 than elsewhere. The author believes that the ganglionic lesion which produced the herpes zoster may be the result of the vascular lesion due to the lymphogranulomatosis or of the cachexia. He does not accept the treatment with arsenic as the cause. He also rejects the theory that toxin is introduced from the ganglion to the skin or that the

nerve stimulus antidromically conducted becomes effective. He bases his opinion upon the noninflammatory nature of the ganglionic lesion and the extension of the eruption beyond the territory of the affected ganglion. He is of the opinion of v. d. Scheer that consequent upon the ganglionic lesion sympathetic cells in the spinal cord are stimulated and the alteration of the skin is the expression of this vasomotor stimulus which takes place on the reflex path. This means that idiopathic as well as symptomatic herpes zoster arises by way of the sympathetic whether the latter itself suffers injury or whether it is some part of the nervous system, disease of which acting reflexly upon the sympathetic causes the outbreak of the herpes.

Arnstein, A. HERPES ZOSTER. [Wien Arch. f. inn. Med., July 25, 1922, IV, Nos. 2-3.]

Instances of herpes zoster developing as the only appreciable manifestation of internal disease are not unknown. The author himself has collected a number. In this communication the findings in thirty-six cases of herpes zoster are compared with 180 from the literature. A specific virus localized in one or more of the spinal ganglia is responsible. The epidemiology and immunity phenomena support this. In some it is symptomatic, and is thus relatively frequent in nervous affections, and with disease of the lungs, liver and kidneys, while it is rare with digestive, genital and heart disease.

De Josselin, De Jong, R. CEREBROMATA, A PECULIAR FORM OF NEUROMATA. [Nederlandsch Tijdschr. voor Geneeskunde, LXVI, November 4, 1922, p. 2124.]

The writer reports his observations on two cases of a peculiar kind of neuroma which he calls cerebromata. A large swelling in the neck of an infant of one month was removed: clinically it suggested a branchiogenic cyst, albeit one of exceptionally large size. It proved a cyst whose wall—composed of a peculiar light grayish-yellow tissue which protruded into the lumen in the form of numerous large and small smooth nodosities and bars and gave to its surface a peculiar uneven appearance. Microscopically it consisted of a tissue that bore a close resemblance to brain tissue; thus, it was rich in the development of glia tissue (astrocytes), numerous ganglion cells with fine processes, nonmedullated nerve fibers but none medullated; here and there cavities lined with cells closely resembling ependymal cells, and, finally, typical tela tissue in fine branched figures. There was, then, here a cystic tumor that contained the elements of brain tissue; a choristoma, or rather a choristoklastoma in Albrecht's sense; or a cystic ganglio-glioneuroma with tela tissue, a cerebroma. The writer derives this kind of tumor from a group of cells that at a very early period of development moved out from the medullary groove. He brings it into comparison with the known kinds of neuromata of the sympathetic system and the adrenals (sympatho-blastomata, etc.), with certain

peripheral neuromata, and with a couple of very peculiar ovarian teratomas previously studied by himself, in one of which a very great development of brain tissue was found, and in the other a surprisingly definite development of cerebellar tissue, with granule layers, Purkinje cells, and pial investment. [Leonard J. Kidd, London, England.]

Edel, K. ETIOLOGY OF HERPES. [Med. Tijd. v. Gen., July 15, 1922, II, No. 3; J. A. M. A.]

Edel reviews what has been published in recent years on herpes and its virus. Kooij has cultivated a microorganism from herpes vesicles which induces a special keratitis in the rabbit. It is transmissible, and the same microorganism could be recovered from the blood and spleen of the rabbits. It reproduces in animals a disease analogous in every respect with lethargic encephalitis. This microorganism is found in the sputum, and carriers have been encountered. There is thus considerable evidence, he says, that the virus of epidemic encephalitis and of herpes is identical. The coincidence or sequence of herpes and varicella has been reported by innumerable writers. It seems plausible to assume that the virus has an affinity both for the skin and for the nerves. When the dermatropism prevails, varicella develops; when the neurotropism predominates, we get herpes zoster. This dual affinity may be influenced by special conditions in the nerves, or toxic action from an infectious process, or chemical or mechanical influences may decide whether the virus manifests itself in skin or nerves.

3. SPINAL CORD.

Camus, Jean. RECENT ADVANCES IN NEUROLOGICAL THERAPEUTICS. [Paris Médical, October 7, 1922; B. M. J.]

The author here concludes his annual review of neurology in 1922 by describing recent advances in treatment. Painful cramps in paraplegia "en flexion" have been successfully treated by intramuscular injections of cicutine hydrobromide, the dose being 1 to 3 mg. each day for eight consecutive doses. Almost all the patients experienced rapid improvement, sometimes within three or four hours of the injection. Pain and involuntary contractions of the lower limbs are especially relieved, and patients sleep better. The treatment is successful in different types of spastic paraplegia, whether due to compression by tumor, Pott's disease, injury to the cord, or syphilitic myelitis. The good effects last for four or five days after discontinuance of treatment; freedom from pain may be maintained by further injections (0.5 to 1 mg.) every second day. Pierre Marie and others have compared the results of hypodermic injections of curare (5 to 10 mg.) in similar cases. Curare acts as powerfully and more rapidly than cicutine. The former appears preferable in more severe cases. Calvé has treated severe paraplegias due to Pott's disease

by intraspinal aspiration of cold abscess. In three cases he has obtained two cures, and in the other cases marked relief. Collewaert has devised reëducative treatment of cases of writer's cramp by means of passive and very gentle active movements, followed by carefully planned writing exercises, the patient sitting at a table of suitable height with both forearms resting on the table and elbows well flexed. Careful modifications of the handwriting to avoid all strain on the fingers, the movements being performed as far as possible by elbow and shoulder, the hand gliding over the paper with minimal finger movements. Camus states that the results of intrathecal treatment are excellent in some forms of meningitis, and he has shown its advantages in tetanus. He has also demonstrated the dangers of intrathecal poisoning by mercurial and arsenical salts, etc. Paulian and Dragesco have injected 1 or 2 c.cm. of 25 per cent MgSO_4 solution into the cerebrospinal fluid in cases of chorea with good results. Marinesco confirms this. Camus remarks that similar treatment in tetanus is not free from danger, and its effect is very doubtful. In a number of mental cases—acute mania, general paresis, delirium tremens, and dementia precox—Urechia has obtained good results from intrathecal injections of isotonic solutions of calcium salts. Marinesco continues to recommend intrathecal injection of salvarsanized serum in cases of neurosyphilis, but Sicard has seen no beneficial results and considers the treatment dangerous. Autoserotherapy may produce anaphylaxis, even when the serum has been heated to 55° . Camus states that certain authors have found spirochaetes in cases of disseminated sclerosis a few hours after death, although the Wassermann reaction was negative. He recommends treatment by neosalvarsan, when the diagnosis is certain. Karl Petren has treated paralysis agitans by combined active and passive movements systematically carried out for a long time. He claims that cases have improved and that progress of the disease has been retarded by this treatment. Rodriguez, however, has seen no improvement result from physical methods, but relies upon sodium nucleinate and cacodylate and scopolamine given hypodermically. Sicard also recommends this treatment in conjunction with massage and Swedish movements. In epilepsy, luminal (gardenal) has been very generally used, but it is stated that it sometimes produces mental torpor and in other cases delirium. The dose should therefore be reduced very gradually and belladonna, caffeine, bromides, and potassium biborate, in conjunction with luminal, are recommended. In status epilepticus, bromides, luminal, bleeding, hypodermic injections of scopolamine (0.1 or 0.2mg.), rectal injections of chloral, and inhalations of chloroform have all been recommended.

Bayliss, W. M. SIR JAMES MACKENZIE'S THEORY OF DISTURBED REFLEXES. [Correspondence. B. M. J., February 3, 1923.]

Granting the possibility of changes in reflex arcs of such a kind that an abnormal response is brought about, there seems no doubt that the

phenomena must play a very important part in the symptoms observed in various diseased conditions. A few remarks from the point of view of a physiologist may perhaps be of some interest in the discussion. Mackenzie refers to the action of strychnine, tetanus toxin, and similar agents which cause incoördinated reflex convulsions. I believe the nature of this effect was first analyzed by Sherrington and shown to consist in the reversal of what is normally an inhibitory action by the afferent stimulus on the motor centers of the antagonists of those muscles concerned in the reflex movement, so that the result is simultaneous contraction of opposing muscles. This conversion of inhibition to excitation is particularly disturbing when inhibition is the chief part of the innervation process, as in opening the mouth by relaxation of the temporal and masseter muscles. As Sherrington points out, the greater the effort to open the mouth, the more powerfully is it closed, on account of the great power of the muscles which close the jaw compared with that of those that open it. This above-mentioned reversal was worked out by myself in its application to vasomotor reflexes, and it appears to be a very general phenomenon in nervous processes. I was also able to show that the pharmacological antagonists of strychnine, such as chloroform, chloral, etc., have the opposite effect in vasomotor reflexes, in that they convert the excitatory process into an inhibitory one, and it was shown soon afterwards by Sherrington and Sowton that the statement applies also to reflexes to voluntary muscles. The sequence of events in such a case as the effect of strychnine on the depressor reflex in the rabbit, may be of some significance. As the dose is gradually increased, we see at first an exaggeration of the normal vasodilator effect; this is step by step converted into a vasoconstriction and ultimately paralyzed altogether. It appears as if reversal were a stage in the paralyzing action.

It is not to be understood that reversals of this nature are only of toxic or pathological origin. They make their appearance in normal neural processes, as shown by the following experiment due to Magnus. The direction of the movement of the tail of a spinal cat, when the tip is pinched, varies with the position in which it hangs. This movement is always towards the stretched side, so that the same afferent impulse produces in one position excitation of those muscles which are inhibited in the opposite position. The condition of the center must be changed by receipt of afferent impulses from the stretched muscle. Sherrington and Graham-Brown, moreover, showed that the sign of the effect from a particular cortical point varied according to whether other points were stimulated at the same time, and whether the point itself had recently been in activity. Thus, as is so frequently the case, the morbid process is essentially a running wild, as it were, of a natural one.

But in any case we realize what a wide field of research is opened up in the interpretation of symptoms on lines akin to this. It will be generally admitted that very little, if any, advance is made by the mere

multiplication of symptoms recognized unless we know more about them. They may be merely indirect results of previously known ones. The analysis must be pushed further back in the way indicated by Sir James Mackenzie, while the correct recognition of the less obvious signs will greatly assist in this. We see also how the possibility of disturbed reflexes warns against hastily assuming a local manifestation to be due necessarily to a morbid process in this particular place.

Sir James Mackenzie points out that there may be a disturbance in the receptor or effector part of the reflex arc as an additional possibility to that already referred to concerning the nerve center or adjustor. I may recall certain facts which suggest that an agent which normally produces a contraction of smooth muscle, by stimulation of the peripheral myoneural junction, may be reversed in its action by the presence of a toxic substance, so that it now causes relaxation or vice versa. This suggestion was made some years ago by Dr. H. K. Anderson, in explanation of the experimental fact, found by Elliott, that the contractile action of adrenalin may be converted by ergotoxine into an inhibitory one. I subsequently put forward the same view myself, in ignorance of Dr. Anderson's having previously done so. A similar effect is that described by Langley in the case of the bladder, in which stimulation of the sacral nerves causes inhibition after nicotine or curare, in place of the normal contraction; and that by Dale and Laidlaw, in which it appears that cytisine may convert the normal secretory effect of the chorda tympani nerve into an inhibition of secretory activity already in progress.

Our attention is also directed to the part played by the process called "facilitation" by Sherrington. In this a stimulus, itself below the threshold of activity, is made active by the simultaneous play of stimuli from other sources upon certain neurones in the course of its passage through the nerve centers. This is pointed out as being of especial importance in correctly estimating the value of symptoms of pain. I thoroughly agree with the emphasis laid by Sir James Mackenzie on disturbances of blood supply. It is clear that a vital organ may suffer from want of oxygen, not only owing to failure of the heart or loss of circulating blood, but also from a local spasm of arterioles, which may well be due to a disturbed reflex. Although I can lay no claim to express any opinion on clinical matters, it seems to me that the disturbance of reflexes described must undoubtedly take place, and, if so, a powerful means of analyzing and interpreting the complex symptoms of disease has been provided.

de Jong, S. I. TEMPERATURE AFTER INJURY OF SPINAL CORD. [Bull. d. l. Soc. Méd. d. Hôp. January 12, 1923, XLVII, No. 1.]

This clinical case of a soldier paraplegic after a fracture of the laminae of the sixth and seventh cervical vertebrae by a bullet, with a temperature of 77° F. and pulse of 36. The day following the temperature was 83½° F., the pulse 40. The patient's mind was clearer

and the third day the temperature was 90 to 94.6° F. and pulse 84. The fourth day the temperature rose to 104° F. and the man died. A hemorrhage had still further injured the spinal cord.

Frazier, C. H., and Spiller, W. G. SECTION OF THE ANTEROLATERAL COLUMNS OF THE SPINAL CORD. [*Am. Arch. Neurol. & Psychiat.*, 1923, IX, 1. Med. Sc.]

The authors believe that certain selected cases of intense and intractable pain may be effectively dealt with by the operation of chordotomy. They do not claim that this is entirely successful in every case, since some fibers of the spinal path for pain may escape the knife. They also emphasize the fine technique and skill the operation demands from the surgeon. Division of the pyramidal tracts appears to be the complication most to be feared. Eight cases are reported. Pain was abolished in six and greatly relieved in the remaining two. In one case the operation had to be performed three times before relief was obtained. A successful operation results in complete loss of sensation for pain and temperature below the level of section on the opposite side of the body, a fact which indicates the complete crossing of the pain and temperature path. When the abdominal wall is involved, the sensory loss is apt to be incomplete just below the level of section, presumably because decussation is not immediate, but occurs over several segments. The rectal and vesical sphincters escaped except in one case, where there was evidence of pyramidal tract involvement by the section. This may also have been the cause of the loss of sexual power observed after operation in another (male) patient. Chordotomy at the level of the fifth thoracic section produces sensory loss up to a line two inches above the umbilicus. Above this is a zone of transition from complete loss below to normal sensory acuity above. Pressure sense is unaffected by the operation. Isolated analgesia or thermanesthesia was never observed, both forms being invariably lost. Some pain at the level of the section may follow the operation, and may last for a week or longer. The great indication for the operation is intense pain from inoperable malignant disease, and when this is unilateral, section of the crossed anterolateral column may suffice. Bedsores resulted in two cases, in one of which the pyramidal tracts were involved. The highest level of the cord treated in this way was the first thoracic segment. In this case ocular symptoms of sympathetic origin were noted. Detailed clinical records and an account of the operative procedure are given. [F. M. R. Walshe.]

Kraus, W. M. THE DIFFERENCE BETWEEN A MUSCULAR AND A NEUROMUSCULAR INTERPRETATION OF WALKING. [*Am. Arch. of Neur. and Psych.*, IX, No. 2, p. 184.]

Simple observation of walking and running in a normal man does not permit of a precise analysis of the various phases of gait. The movements are too rapid and the transitions between flexion and extension,

etc., are too small to give accurate results. Advantage was therefore taken of cinematographic pictures by which a considerable number of successive phases of walking and running could be obtained. Observations thus made must be correlated with our knowledge of the embryology of muscles, their grouping and nerve supply, in order to arrive at an adequate interpretation. The phases of gait are four: (1) The ventral finlike movement of the lower limbs at the hip, (2) the dorsal finlike movement of the lower limbs at the hip, (3) the reflex element, and (4) the support element. The sequence of these is rhythmic. The order of sequence is 1, 3, 2, 4—1, 3, 2, 4, etc. The first two (1 and 2) represent activity of singly-hinged appendages. The second two (3 and 4) represent activity of three-hinged appendages. The first two and the second two each constitute a pair of corresponding opposites.

In the first two the leg acts like a rod, leaving out of consideration the two large points at the knee and ankle. The muscular activity of the dorsal and ventral phases are antagonistic and opposite. Support and alternating muscular activity at the three great joints are also opposites.

4. MIDBRAIN, CEREBELLUM.

Betchor. MUSCLE TONUS. [Schw. Arch. f. Neur. u. Psych., 1918.]

No constant relation whatever exists between muscular tonus, intensity of corresponding tendinous reflexes, and contractures. When tonus and reflexes are discordant, there seems to exist a causal connection in this sense that a lack of tonus intensifies the reflexes by a mechanism comparable to the well-known law of Weber-Fechner. Inversely, a strong contraction of the muscle diminishes the reflex, a fact of daily observation. Hypotony in a motor nerve cell intensifies all its responses to stimulation, as well such of reflex character as such of voluntary character. This law will explain the symptom dysmetria as it explains the symptom exaggeration of knee jerk, etc., in cerebral or cerebellar diseases. [Author's abstract.]

Gordon, A. FAMILIAL FRIEDREICH'S ATAXIA. [Philadelphia Neurological Society, February 23, 1923.]

Case I—Mother, age fifty-six. Was in good health and quite large up to seventeen years ago. At that time she observed first an awkwardness in the fingers of one hand. This was followed by a gradual wasting of the muscles of the hands. The atrophy gradually ascended to the lower extremities and finally to the muscles of the thorax and of the face. When first examined about ten years ago she presented with one exception the same condition as she shows now. The exception consists in the state of the patellar tendon reflex, which was then plus, but now abolished.

At present the picture is that of progressive muscular atrophy of the

spinal type. The onset, the long course, the claw-like hands, the gradual spreading of the atrophy to the upper and lower extremities, to the thorax and face, the deformities in feet due to an irregular distribution of the atrophy in the agonistic and antagonistic muscles, the lordosis which is due to the atrophy of the spinal muscles, the reactions of degeneration of the affected muscles—all speak in favor of the above diagnosis. The tongue presents a fine tremor; is also somewhat flabby, but the power of its movements in all directions is still preserved. The knee jerks and tendon Achilles reflexes are all lost even on reinforcement. The tests for the plantar reflex give no response whatsoever. The biceps and triceps reflexes in the upper extremities are equally abolished. The jaw reflex is present and slightly increased. Sensations are normal all over the body. Sphincters are intact. The eye examination shows a convergent right eye, the pupils are $2\frac{1}{2}$ mm.; the right slightly irregular, and both react sluggishly to light and accommodation. The retinal veins are somewhat tortuous, otherwise the eyegrounds are negative. There is a moderately high degree of hypermetropia with astigmatism. The external ocular muscles are unimpaired. On two occasions the patient sustained fractures of her right lower limb after an insignificant trauma. Her gait is that of cases with multiple neuritis, namely a high steppage gait. There is a slight incoördination in walking very likely because of the atrophic condition of the extensor muscles. Lately she developed some difficulty of deglutition and of respiration. During her entire illness did she at no time suffer from pain in any part of her body. The state of deglutition and respiration, also the condition of the tongue—are suggestive of the bulbar involvement of the atrophic process. Her previous history is entirely negative. Wassermann is negative for the blood. She had four children, three of whom died at an early age. The living child presents the following history:

Case II. Girl, sixteen, always of good general health, commenced to notice difficulty in walking several months ago. Upon examination one observes a slight Romberg sign; the gait is somewhat difficult, because of the equinus position of the feet; the latter are short, as if pressed anterolaterally; the toes are clawlike because of forced extension. The knee jerks and tendon Achilles reflexes are lost. Babinski is present more frequently on the right than on the left side. In every other respect the patient is normal. The upper extremities, speech, eye muscles, sphincters, and sensations are all intact. The case evidently belongs to the category of Friedreich's ataxia. The characteristic feet, the slight ataxia of station, the absence of tendon reflexes, the presence of the toe-phenomenon, the onset of the disorder at the age of puberty—all speak in favor of the above diagnosis, although there is no nystagmus, nor speech involvement, nor ataxia of the upper extremities; but they are all later phenomena, as is the involvement of intelligence which is manifested in dullness and childishness. The present patient is only in the

early stages of the disease and therefore the other manifestations could not be expected at her age. It may be of interest to note that the appearance of the disorder dates from the time she commenced to use her lower extremities more forcibly; she is obliged by her occupation of selling to stand almost the entire day. This is in conformity with Edinger's "Ersatz-Theorie," the theory of exhaustion, which explains the onset of the symptoms of Friedreich's ataxia at the age of puberty.

The two cases in the same family demonstrate a lack of development or of resistance of the central nervous system; in the mother of the ganglionic cells and in the daughter of the tracts of the white matter. [Author's abstract.]

Schaffer, K. CONTRIBUTIONS TO DOCTRINE OF CEREBELLAR HEREDODEGENERATION. [J. f. Psychol. u. Neurol., 1921, XXVII 12; Med. Sc.]

The collective term of heredodegeneration has previously been used by the authors to indicate various inter-related, hereditary, and degenerative disorders of the nervous system which are characterized by certain typical and common features such as the familial appearance, homochronicity, homotypism, and a more or less strikingly progressive course. These conditions were subdivided by R. Bing into: (1) types in which the degenerative manifestations are predominantly motor, including the spastic and dystrophic forms; (2) predominantly sensory, as in hereditary spinal and cerebellar ataxias; (3) predominantly psychic as in familial idiocy; (4) dyskinetic forms, including the myotonic, myoclonic, choreic, and tremor groups. The intrinsic nature of these hereditary forms is unknown. The histological findings, however, point to the existence of a close anatomical inter-relation similar to the close clinical relationship. In support of this suggestion Schaffer was able to emphasize the following points: (1) The process affects only the ectodermal components of the central nervous system. (2) It involves the cell processes and corresponding bodies. (3) It is characterized by a marked swelling first of the cell bodies, then of the dendrons, and finally of the axons. Out of the twelve cases previously investigated only one showed alterations of the mesodermal constituents, and in this case the lesion was circumscribed and doubtless due to an inflammatory process of exogenous origin.

The two cases which are the subject of the present paper appear to support Schaffer's contention. The first was an idiot who was affected by an hereditary cerebellar ataxia without any trace of Friedreich's disease and who died of an intercurrent affection at twenty-one. From an anatomical point of view the following malformations were noted: (a) Many deviations from the ordinary type of fissures and furrows of the brain convexity; (b) hypoplasia of the cerebral peduncles, cerebellum, and pons; (c) presence of binucleated nerve-cells in the cerebral cortex; (d) cytoarchitectonic alterations in the so-called association centers of Flechsig. The degenerative changes, which had evidently started in the

cerebral hemispheres, had spread all along the cerebropontine-cerebellar system, while the motor and sensory regions of cerebral cortex and the systems of fibers connected with them appeared to be hardly affected. In the hypoplastic cerebellum degenerative changes were almost exclusively found in the hemispheres, viz. they had an essentially neocerebellar distribution. Histologically the degeneration was confined to the ectodermal components while the mesodermal elements did not appear altered in any way. This selective form of degeneration was particularly evident in the cerebral cortex, where it was characterized by a peculiar topographic distribution spreading from the external to the internal principal layers. As to the origin of such lesions two points are particularly emphasized by the author; first, the incomplete development of the cortex cerebri and cerebelli probably due to an original weakness of the neuroblasts which form the lamina corticalis (endogenous hereditary factor); second, a possible toxic influence acting on the nervous tissue during the early embryonic life as admitted by the school of v. Monakow (exogenous toxic factor). The second case was a woman of forty-one years of age who died of an intercurrent affection after having exhibited for many years the picture of a typical cerebellar ataxia associated, in the end, with premature senility. She came from a family many members of which had been or were affected by the same malady. At the post-mortem examination only a relatively moderate degree of atrophy of the cerebellar hemispheres was observed, while the histological investigation of the central nervous system revealed a double series of lesions consisting in a profound alteration of the nerve-cells of cerebral cortex, and in a complex systemic brain degeneration. The former, though extremely diffused, was particularly noticeable in the angular and fusiform convolutions and cornu ammonis, the layers from III to VI being most affected. The alteration itself was characterized by swelling of the cell bodies, wasting and disintegration of the Nissl granules whereby the spongiosoplasm was thrown into relief; and, at a farther stage, by transformation of these web-like structures into a fine granular detritus resulting finally in complete atrophy and destruction of the diseased nerve-cells. In the cerebellum the phylogenetically and ontogenetically younger portions in particular were affected by the degenerative process, the Purkinje and basket cells exhibiting the same pictures as observed in the cerebral cortex. The systemic lesion chiefly affected "the intracentral cerebellar neurons, the sensory root protoneurons of pons and medulla oblongata as well as pyramidal neurons." In other words, the degeneration had a distinctly combined character, as one sees, for instance, in combined sclerosis of spinal cord involving the posterior and lateral columns. The difference consisted only in the fact that the heredodegenerative process, instead of being primarily spinal, was in Schaffer's case primarily cerebral. In this case also, as in the former one, no lesions of the mesodermic elements were found, viz. the process was "strictly parenchymatous, endogenous, and without trace of vascular reaction." [C. da Fano.]

Stibbe, F. S. HEMIPLEGIA ALTERNANS SUPERIOR. [Nederlandsch Tijdschrift voor Geneeskunde, LXVI, November 11, 1922, p. 2142.]

A Javanese man, thirty, who had had lues some years previously, began gradually to see and walk badly six months ago, but had no pains. His viscera were normal. He has hemiparesis and ataxia of the left arm and leg, lively tendon jerks but no Babinski nor Oppenheim signs, very poor visual acuteness, but no paralysis of extrinsic eye muscles, no nystagmus, no ptosis, a large right pupil, reacting to light much more sluggishly than the left, and not round in outline, with bilateral choked disc. The right sphincter pupillæ palsy with the left hemiparesis and ataxia brings the case into the category of the Weber-Benedict syndrome. The lesion in this case is almost certainly a gumma, especially because benefit followed on potassium iodide. The isolated palsy of the right sphincter pupillæ points to a lesion of the anterior part of the nucleus lateralis of the oculomotor nucleus, and the ataxia points to a lesion of the middle fillet. These symptoms occurred simultaneously, so that the lesion can be placed in the lowermost part of the right cerebral peduncle. The peculiarity of this case is the separate paresis of the sphincter pupillæ. [Leonard J. Kidd, London, England.]

Ingvar, S. THE CEREBELLUM. [Hygiea, December 16, 1922, LXXXIV, No. 23.]

In this study the author shows how the cosmic stimuli known as gravity and inertia have come to be handled for the body as a whole through a centralizing series of mechanisms. These are the cerebellum and inasmuch as these cosmic stimuli affect all animals the structure has closely related analogical features.

Curschmann, H. HEREDITARY CEREBELLAR ATAXIA. [D. Zschr. f. Nervhik., Vol. LXXV, Nos. 4, 5.]

Curschmann reports cerebellar ataxia in two brothers and their two sons with psychic changes in one father and son. In all cases there were no symptoms of the posterior columns nor of the pyramidal tracts. The upper extremities were not affected.

Frets, G. P., and van Londen, D. M. A TUMOR ORIGINATING IN THE ROOF OF THE FOURTH VENTRICLE. [Nederl. Tijdschr. voor Geneeskunde, August 18, 1923, LXVII, p. 730.]

The writers have shown to the South Holland Neurological Society the tumor in a boy of fourteen which originated in the roof of the fourth ventricle. Diagnosis was difficult, for there was a rather strongly positive Wassermann reaction in blood and spinal fluid. Nonne reaction was negative, there was no pleocytosis, pressure on lumbar puncture was normal, and choked discs appeared rather late in the illness. For a few weeks before death there were epileptiform attacks, and death in respiratory standstill. Necropsy showed great accumulation of fluid in the

posterior fossa, especially in the pontine region; the brain was enlarged, and there was great hydrocephalus. A large tumor was found originating in the fourth ventricle roof and penetrating far into the cerebellum which, however, was not enlarged. The site of the tumor explains the hydrocephalus and increased intracranial pressure while there was no increase of pressure in the spinal cord. The tumor showed many hemorrhages and a cyst, yet it appeared to be sharply limited from its surroundings. Microscopically, it is a glioma. Cajal preparations show that there is a gradual transition of glia tissue into tumor tissue. Nissl preparations show cells with vacuoles, also with processes, interstitial material, hemorrhages, cystic changes, and large nuclei poor in chromatin, such as Alzheimer describes. No indications of lues, gummatous or vascular changes. [Leonard J. Kidd, London, England.]

8. NEUROSYPHILIS.

Colin, H., Laignel-Lavastine, and Mourgue, R. CLINICAL AND ANATOMICO-PATHOLOGICAL STUDY OF PARESIS. [L'Encephale, Vol. XIV, No. 10/12, p. 311.]

The author states that numerous authors have emphasized the great similarity of this syndrome to the paretic syndrome in syphilis, mentioning particularly Mott and Spielmeyer. This resemblance is not astonishing if, as Schaudinn maintained, there is a biological relationship between the trypanosome and the treponeme. The authors describe a case with reference to the relationship between these two diseases. The patient had contracted trypanosomiasis and had been treated with atoxyl with amelioration of symptoms. Returning to France, he was attacked with narcolepsy and came under the authors' observation. The clinical course of the disease followed that of general paralysis. In the hereditary history there were the same mental and organic tendencies which favor the development of paresis. The period of incubation was ten years, corresponding to the usual period in general paralysis. The principal psychic symptoms were loss of memory, general dementia, euphoria, puerile affective states. There was paralysis in the form of hemiplegia of the right arm, and epileptiform attacks. The pupils reacted normally to light. Wassermann was negative. Nonne-Apelt reaction, positive. The autopsy revealed that the principal foci were in the brain and medulla oblongata, there being no pronounced visceral lesions. There was great preponderance of encephalic lesions of interstitial and essentially meningo-vascular character. In the foreground of the histological picture was the infiltration of the subarachnoid spaces and intra-adventitial spaces with lymphocytes and plasma cells. The presence of the plasma cells is very interesting because until they were discovered in trypanosomiasis they had been regarded, following Nissl, as pathognomonic for general paralysis. As in Mott's case, all intermediary forms between the lymphocytes and plasma

cells were observed. Among the elements of the vascular infiltrations the authors found large pale cells with oval nuclei derived from the proliferations of the endothelial cells of the adventitial tunic of the nutrient arteries. As for the cerebral parenchymatous lesions they were all secondary to the meningo-conjunctivo-vascular lesions, not only the softening produced by the arteritic obliterations, but also the chromatolysis of the nerve cells, so that sleeping sickness may be regarded as essentially the consequence of an affection of the pia-arachnoid characterized by lymphocytosis and formation of plasma cells. The authors compared their histological findings with those of two other cases and discovered that in their cases the vascular lesions were much more intense than in the other cases, due, in the authors' opinion, to the atoxyl therapy, which in prolonging life permitted extension of the disease processes. The cerebral destructions in sleeping sickness are to be compared with those of galloping paresis. A striking feature was the intensity of the vascular processes and its extension into the white substance. This condition, according to the authors' experience, is not met with in general paralysis. In their opinion general paralysis is a diffuse encephalitis with predominance of the cortical affection, where the parenchymatous lesions develop parallel with the meningovascular degenerations and are not secondary to them as in sleeping sickness. [J.]

Taft, A. E. PATHOLOGY OF CHOROID PLEXUS IN PARESIS. [Arch. of Neur. & Psych., February, 1922, VII, No. 2; J. A. M. A.]

In the sections studied by Taft a progressive fibrous change was traced, beginning with general increase of connective tissue, followed by obliteration of capillaries, with formation of fibrous tufts, in which calcium salts are deposited, and final cystic condition of the plexus. At this stage the capillaries have entirely disappeared, but the ependymal cells remain and are little changed morphologically.

Aubry and Trampol. ARSENICAL TREATMENT OF GENERAL PARALYSIS. [Rev. Méd. l'Est, March 1, 1922.]

Twenty-seven cases of paresis treated with intramuscular injections of novarsenobenzol are here reported. The authors started with 0.15 gram up to 1.05 gram, at intervals of four days; and afterwards every eight days—the total amount given being 7 to 8 grams. The results were: 13 failures, 7 remissions with progressive symptoms later, and 7 marked remissions lasting for a considerable period—in one case nearly four years and in another two years. The improvement when it occurred was chiefly noticeable in the mental condition. No bad results were recorded. Even allowing for mistaken diagnosis and the spontaneous remissions which sometimes occur in general paralysis without treatment, the authors consider novarsenobenzol injections of much benefit in some cases. Other physicians have recorded similar results from this treatment.

de Fursac and Furet, ARSPHENAMIN IN PARESIS. [Encéphale, January, 1922, XVII, No. 1; J. A. M. A.]

De Fursac and Furet report the results of arspenamin treatment in forty-three cases of general paresis, from September, 1920, to October, 1921. The treatment was given to fifty-two patients but was suspended in nine at the very beginning on account of intolerance, intercurrent affection or transfer of patient to his family or to another hospital. The following results were obtained in the remaining forty-three cases: No results in fifteen; striking notable remission in ten; appreciable remission in ten; arrest of the disease without noticeable improvement in eight. This shows that if arspenamin treatment does not cure those with general paresis, it is at least capable of improving their condition. Spontaneous remissions could scarcely reach such notable proportions. These results demonstrate that arspenamin treatment of general paresis, given in small doses, often repeated, up to a total of 9 gm., is without danger. Furthermore it produces remissions, and in certain cases psychic remissions, equal to recoveries.

Ebaugh. TREATMENT OF PARESIS BY INTRACISTERN ROUTE. [Am. Arch. of Neur. & Psych., March, 1922, VII, No. 3.]

This author, following Anton and Ayers' notions of puncture of the cisterna magna for the treatment of paresis, have carried out the technic 250 times in twenty-eight patients. The clinical results suggest further trial of the method which of itself seems harmless.

Cornil, Lucien, and Robin, G. HEMORRHAGIC PACHYMEINGITIS IN A PARETIC. [Presse Médicale, March 25, 1922, p. 260.]

The writers report a case of a hemorrhagic pachymeningitis which came on in a general paralytic without any appreciable clinical symptoms. Necropsy showed the existence of two voluminous blood cysts, each containing about 150 grams of blood, in the parietal regions. The histological examination confirmed the old opinion of Cruveilhier that the hemorrhage is due to the rupture of the newly formed blood vessels of the meningeal thickenings. [Leonard J. Kidd, London, England.]

Key and Pijper, JUVENILE PARALYSIS. [South African Med. Record, September, 1921, XIX, No. 18; J. A. M. A.]

Key and Pijper cite the case of a boy, aged twelve, who first manifested symptoms when eight years of age. When about nine years old he commenced to have sleepless nights, and was frequently noisy. When he was about ten years old it became evident that he was failing mentally. He was careless about his dress, and his habits became faulty. During the next two years he became more enfeebled mentally; gradually began to lose all interest in things around him; his speech became defective; he would scream loudly for no apparent reason, and toward the latter part of that period was slovenly at table, and eventually had to be fed. About

four months before admission the parents noticed that the patient's walking was becoming worse. He fell in the garden on several occasions, and about three weeks before admission was unable to stand without assistance. He was by this time only able to utter a few words, but showed that he could recognize his father and mother. About five weeks after admission, symmetrical gangrene of both feet was well established. On the left foot there was a line of demarcation about the level of the distal end of the metacarpals. The right gangrenous portion extended over half the foot. Six weeks after admission he was unable to take any notice of what was going on around him. The patient's hands were at times cold and blanched, and these attacks were followed by a stage of hyperemia. The hands were kept carefully covered, but in spite of that they became of a definitely bluish tinge. The upper lip and nose were also bluish in color and the skin in these areas peeled off on any attempt being made to wash him. In the beginning of the seventh week the patient had difficulty in swallowing and was unable to retain even milk. He was in a dazed and stuporous state, and was unable to recognize his mother. No seizures were reported. He died toward the end of that week. The presence of syphilis was confirmed by us by means of the Wassermann test. His father gave a four plus reaction. The brain was submitted to a careful examination. Vascular abnormalities were very prevalent all over the cortex. The changes were of a very interesting nature. Side by side blood vessels, apparently quite normal, were seen with others which showed complete hyaline degeneration.

Banus, J., and Sanchis. ALCOHOLISM AND GENERAL PARESIS. [Siglo Médico, Jan. 31, 1920, LXVII, No. 3451.]

The close resemblance, at times, of chronic alcoholic and general paresis has led to this clinical study. Two cases are reported in which lumbar puncture led to the syphilitic etiology in one, whereas in the other a rich hallucinatory content with negative C.S.F. findings confirmed the alcoholic nature of the psychosis.

Levaditi, C., and Marie, A. BLOOD AND CEREBROSPINAL FLUID IN PARESIS. [Revue de Méd., 1920; J. A. M. A.]

Levaditi and Marie report the findings in twenty-nine patients with general paresis, examined repeatedly to determine the relations between and the fluctuations in the findings in blood and spinal fluid in respect to complement fixation, etc. They confirm the importance of the physical changes in the body fluids induced by the spirochetes.

Porot, A., and Sengès, N. PARESIS AMONG ARABS. [Annales de Méd. Jan. 1920.]

It has been a frequently repeated observation that notwithstanding a high syphilitic incidence among Arabs that paresis has been a rare disorder in this race. These authors confirm this impression.

Mirallié, C. ONSET OF PARESIS. [Bull. de la Soc. Méd. des Hôp., July 9, 1920.]

A clinical study showing that not infrequently in women a tabetic syndrome may precede the paretic syndrome. Eleven cases are discussed with reference to the signs of paresis in their inception.

Haguenau. COLLOIDAL GOLD REACTION IN PARESIS. [C. R. Soc. Biologie, Nov. 6, 1920.]

In testing the cerebrospinal fluid in 30 cases of general paralysis this observer here notes that in 28 he has obtained the so-called paretic curve. In the other two cases only a partial flocculation of the gold was obtained, and they might be classed as atypical irregular types. In 6 cases of tabes a typical "tabetic curve" was obtained in 5, but in the remaining case—a tabetic without mental symptoms but with a positive Wassermann reaction—the curve obtained approached more to the "paralytic" type. In 5 cases of syphilitic myelitis or syphilitic hemiplegia showing a positive Wassermann reaction the "paralytic" type of curve was not obtained, nor were reactions of this type encountered in other pathological cerebrospinal fluids. The author concludes that in the reaction of Lange we have a very valuable means of discriminating between general paralysis and other types of neurosyphilis.

Cole, H. N., Gericke, A. J., and Sollmann, T. TREATMENT OF SYPHILIS BY MERCURY INHALATIONS. [Arch. of Derm. and Syph., Jan. 1922, V, No. 1; J. A. M. A.]

Cole, Gericke and Sollmann review the literature and report on their observations with the inhalation of calomel and metallic mercury in syphilis. Inhalations of from 5 to 80 mg., totaling 225 mg. in two weeks, were taken by each of five patients, with active syphilitic lesions. None of these showed any therapeutic response, nor any renal changes. All but one exhibited definite bronchial irritation, salivation and tenderness or edema of the gums. The bronchial irritation and salivation occurred at the time of each inhalation, and were evidently due to direct local contact with the calomel, and not to systemic action. Inhalations of from 5 to 160 mg. of mercury, to a total of from 225 mg. in two weeks to 750 mg. in three weeks, were administered to each of six patients. No systemic or local effects resulted; no salivation (except in one doubtful case) and no sore gums. The weekly dosage amounted to from two to five times the customary intramuscular dosage. It is evident that the absorption must be materially smaller than with intramuscular injections. The results indicate that the administration of mercury compounds by inhalation has no advantage over oral administration; but, on the contrary, it has the serious disadvantage of indefinite dosage, and the consequent difficulty of steering between inefficiency and danger, and of special danger of respiratory irritation.

Smith, Dudley C. TREATMENT OF NEUROSYPHILIS. [Virg. Med. Mo., Jan. 1922.]

The majority of cases of syphilis of the nervous system treated at the present time are in late stages of the disease. Nevertheless, the pathological process usually begins in the nervous system early. This process can be detected early if it is sought properly. Every syphilitic should have complete sensorimotor examinations, repeated serum Wassermanns, and spinal fluid examinations. The first change produced by the treponema is perivascular small round cell infiltration. At this stage intensive general therapy suffices in about ninety-eight per cent of cases. Later the changes caused by the treponema are proliferation of connective tissue and vascular obstruction which prevent general therapy alone from giving a cure. Prevention of neurosyphilis, by diagnosing the disease early and by intensive treatment should be our aim. With a small amount of training the general practitioner can safely and adequately treat a large per cent of cases of syphilis and it is his responsibility to prevent syphilis becoming neurosyphilis. The cases of early neurosyphilis which do not respond to general treatment and practically all late cases of syphilis of the central nervous system require intraspinal treatment in addition to general therapy. Briefly stated a series of treatments consists of eight intravenous injections of arsphenamine, five intraspinal injections of arsphenamized serum, mercury two months, iodides fourteen weeks, and one month of rest. This covers a period of twenty weeks. A minimum of two series is given. Arsphenamized serum is prepared by adding arsphenamine (0.4 mgm.-0.8 mgm.) in fresh neutral solution to clear serum (5 c.c.-10 c.c.). This is heated in water bath (56° C.-60° C.) for thirty minutes, at the end of which time it is ready for injection.

Emphasis was put on the facts that serum-arsphenamine mixture has a higher treponemacidal titre than simple solution of arsphenamine and that albuminous substances are not secreted by the choroid plexus. [Author's abstract.]

III. SYMBOLIC NEUROLOGY.

3. PSYCHOSES.

Havenhase, F. J. LATE RECOVERY FROM CATATONIA. [Zeit. f. d. g. Neur. u. Psych., 60.]

Havenhase reports a case of catatonia that was completely cured after an illness of 8 years. In the literature he has found few cases of late recovery from this psychosis. He sums up the late recoveries, one of which, a case described by Frommer in the "Zeitschrift für die gesamte Neurologie und Psychiatrie," made a record recovery after thirty (!) years. The writer is of the opinion that late recovery occurs

more often but no one describes it because one doubts if the recovery will be lasting. Boven agrees with the point of view of Kraepelin who says in his textbook that catatonia after some time is moderated or of Bleuler who lays all the emphasis upon recovery in the scientific sense and the few really "social recoveries" remaining when he followed up the further history of his patients cured of catatonia. The patient described here was treated in various institutions. In the last years he showed the picture of a catatonic stupor out of which he awoke rather suddenly. At his discharge no schizophrenic symptoms were present. He was soon able to find a place of importance in society and has been promoted a number of times. It is two years since his discharge from the institution "Wolfhese" and he is still well.

Zappert. DEMENTIA IN YOUNG CHILDREN. [Monats. f. Kinder., Nov. 21, 1922, No. 2.]

Zappert reports two cases of infantile dementia from his own practice, and also gives condensed histories of five further cases communicated to him by T. Heller, who was the first to call particular attention to this form of dementia (1908). All seven cases are so similar that there can be no doubt about their belonging to the same group. After a period of normal or approximately normal development, the typical symptoms of the condition begin to appear in the third or fourth year. At first only peculiar inaccuracies of pronunciation are noted, but later speech becomes quite indistinct. In every case great unwillingness to speak developed, until finally spontaneous speech ceased entirely; also the understanding for spoken language was gradually lost. Restlessness, an excited condition, and sometimes hallucinations were common manifestations. Fear states were noted in some instances. The dementia continued to increase and ended in a few months in complete idiocy. The facial expression did not become idiotic, but remained, as a rule, rather intelligent. There were no bodily symptoms connected with the nervous system—no motor disturbances. The condition finally became stationary without impairment of the physical health. One of the children was the son of a physician. The diagnosis at first had been hysteria, but the course of this and other cases confirmed the progressive dementia. All but one in this series were boys.

Moser. INFLUENCING CATATONIC STUPOR BY SUBCUTANEOUS INJECTIONS OF COCAIN. [Arch. f. Psych. u. Nervkr., Vol. LXVI, No. 5.]

Moser discusses the results of Berger's experiments with subcutaneous injections of cocaine in a number of fairly recent cases of catatonic stupor. Results so far do not warrant a general employment of the method nor give ground at present for farreaching hypothetical assumptions. Temporary relaxation of the stupor or the appearance of restlessness may be due to other causes than the cocaine. Repeated use

of the cocain in the same patient as well as injections of indifferent fluids must be tried first.

Ewald. SCHIZOPHRENIA, SCHIZOID, SCHIZOTHYMIA. [Zschr. f. d. ges. Neurologie und Psychiatrie, Vol. LXXVII.]

Ewald discusses Kretschmer's theory objecting to it in the broad sense in which Kretschmer uses it. He believes that this would mean a limitless diagnosis of every striking character as a schizothymic.

Hall, George W., and Neyman, Clarence A. STUDIES OF SCHIZOPHRENIC REACTIONS. [Am. Neur. Assn., 48th Annual Meeting, May, 1922, Wash., D. C.]

The authors based their paper on the study of fifty cases which were selected on a basis of a recent onset and a definite clinical syndrome. The patients were subject to a routine physical and mental examination to which were applied all the modern laboratory methods, which included observations on the chemistry of the blood and a detailed examination of the spinal fluid. Examinations were made on the endocrine functions, including basal metabolism, sugar tolerance tests, etc. Of the fifty cases studied, four of the cases were reported in more or less detail accompanied by the laboratory findings, as above stated. Their conclusions were that there were definite toxic complications in some of the cases, in others endocrine disturbances, while still in others there were certain psychic complexes. While a definite explanation was not given as to the relation between cause and effect, it is their belief that the term "dementia precox" represents a clinical syndrome and not a disease entity. They suggest, as a working basis, that those cases studied may be divided into groups such as a schizophrenic reaction type associated with toxic conditions, second, with endocrine disturbances, and third, with psychogenic disturbances. [Author's abstract.]

Laignel-Lavastine. SYMPATHETIC AND PERIODIC PSYCHOSES. [Prog. Méd., Nov. 11, 1922, XXXVII, No. 45.]

The importance of the vegetative nervous system in some paroxysms of psychoses is emphasized by this author. These cases present usually signs of vagotonia, and can be favorably influenced by exciting the sympathetic (epinephrin) or depressing the vagus (atropin, etc.).

Mott, F. W. MENTAL HYGIENE IN RELATION TO INSANITY. [Lancet, Oct. 14, 1922, II, No. 5172. J. A. M. A.]

Mott urges reforms in provision of separate hospitals for the treatment of acute curable cases and that by spending the appropriations more wisely on the principle that the first duty of the authorities is to prevent disease; failing that, to cure disease, and failing that, to prolong life and relieve suffering, these hospitals will not be a public burden. This can be done as follows: (1) By endeavoring to prevent disease—

that is, by mental hygiene on the lines adopted by the National Committee of Mental Hygiene of the United States of America. (2) By adequate provision of separate properly equipped buildings for the treatment on modern hospital and scientific lines of early curable and borderline cases, uncertified for a period of time, with legal provision against their improper detention, thus avoiding the stigma of asylum detention. (3) All incurable and chronic cases to be segregated, but classified in such a way that adequate and proper treatment can be afforded them. Other important items are: Expenditure on intensive scientifically conducted research in hospitals and laboratories into the causes, prevention and treatment of insanity by skilled, properly paid medical officers and social workers, is likely to be of more use and more economical in the end than expenditure on magnificent and costly buildings. There is great need of systematic teaching of psychologic medicine as part of the medical curriculum. Successful diagnosis is the first step to efficient treatment. A central research laboratory, properly manned and equipped, should be provided for a group of mental hospitals. Among the other measures of treatment that call for urgent reform is a more liberal diet. Occupation is of great value in treatment, but the occupation must be desired by the patient, and he must be interested in it; otherwise it will have no therapeutic value.

Richards, E. L. HYPOCHONDRIACAL TRENDS IN CHILDREN. [*Mental Hygiene*, January, 1923.]

This paper deals with an analysis of 623 children examined. Twenty-six per cent of these would be at present as neurotic types. Enuresis, tantrums, insomnia, vomitings, headaches were among the symptoms which often were used by the children to dominate their environment. The tendency to produce these mechanisms may be based upon constitutional instability, or neuropathic constitution. They have also been interpreted as the result of conflicts associated with the sex instinct and the instinct of self-preservation.

Of the 167 children referred to above as neurotic, 13 per cent presented hypochondriacal tendencies. The ages of these children ranged from three to fifteen years, and the duration of the complaints from three weeks to nine years. The symptoms resembled those of the adult invalid type, including palpitation, shaking of the stomach, headache, pain in the chest, abdomen and legs, weakness, giddiness, a sense of fullness in the epigastrium, and vomiting. These symptoms were, for the most part, unaccounted for by any somatic defects. In all but one case the children had lived in an atmosphere of hypochondriasis, fear of disease, patent medicines, and medical folklore. The pattern of the reactions was therefore well established in the child's memory, and, under the strain of any unusual situation or emotional stimulus, the symptom-picture appeared automatically. In such cases reconstructive

therapy includes psychiatric social service, in the form of contact between the family and the worker connected with the clinic. Visits to the family of the patient should immediately follow the patient's visit to the clinic, in order to emphasize the advice of the physician, and clear up any points which may not have been understood. The success of the reconstructive work will depend in large measure upon the reception accorded to the worker's suggestions, and the coöperation of the family. It is frequently necessary to win over ignorant or hostile parents to new ideas in regard to the care of the child. The support of the schools is of inestimable value in this connection, for the teacher holds a position of respect in the families of her pupils, and her suggestions will generally be listened to with confidence.

It is most important to bring the family to an inward understanding of the necessity for the measures advised by the physician, in order to ensure the conscientious carrying out of the plan. Even if the physicians orders are literally carried out, little will be accomplished unless the family believes in the method and coöperates spontaneously.

The data collected demonstrates a rapid relief of somatic incapacitation following the institution of a new therapeutic régime. Of the 22 cases studied, 18 displayed complete elimination of complaints within one or two months after the first visit to the clinic.

Two cases are cited. In both the child complained of symptoms such as headache, insomnia, heart disturbances, restlessness, and exhaustion, which incapacitated him for school, but which had no organic basis. In both cases the mother was hypochondriac, and suggested various symptoms by her overanxious care and questioning. In both cases the child was a little domestic tyrant, who obtained what he wanted by the simple expedient of crying, developing symptoms, and working on the feelings of his family. In one case nothing could be accomplished by the physician and workers, for the reason that the parents persistently refused to coöperate. In the other case the child was sent to a farm where he had regular schooling, wholesome food, and outdoor play. He recovered completely. His parents were educated by the worker to the extent of refraining from further coddling of the child's ills, and a complete adjustment was made.

The fact that the child's symptoms corresponded almost *in toto* to those of the mother, in these cases, demonstrates the large part played by imitation in child behavior. Therefore, the only cure for such hypochondriacal states consists in removal from the environment which tends to impress disease patterns indelibly on the child's mind.

Another case is cited, in which both parents complained unceasingly of pains, the entire family quarrelled constantly, and the patient, a child nine years of age, was left to play in the street or go to blood-and-thunder movies, for lack of parental supervision. A sensational health talk by a tactless teacher, superimposed upon the family pattern of

palpitation and neurasthenia (hypochondriac), inspired an acute attack of cardiac pain. When the child was reassured, and the parents were convinced that they were healthy, and consequently ceased to complain, the entire situation was cleared up, and the child remained free from symptoms.

Riggs, C. Eugene. THE PUERPERIUM FROM THE STANDPOINT OF THE NEUROPSYCHIATRIST. [Minnesota Medicine, June, 1922, p. 375.]

According to Virchow, "a woman is a woman because of her ovaries." Of the 30,000 or 200,000 ova in the ovary at birth, only about 400 mature between the ages of fifteen and forty-five (Berman). Puberty will be calm or stormy according to the manner in which the ductless glands react to the eruption of the ovary. Pregnancy is the time of somatic testing. Maternity is beset with countless fears; dominant among these is the fear with which the life instinct views the approaching ordeal and the nature shrinking from the inevitable pain incident to confinement. The affections incident to the puerperium are localized traumatic neuritis due to the pressure of the head, obstetrical palsies, the cerebral palsies of childhood, neurasthenia, hysteria, Korsakoff's syndrome and the psychoses. Neurasthenia and hysteria are disorders of personality and are the neurotic fringe of an unstable nervous system. There are no insanities peculiar to the puerperium; they differ in no way from those occurring in the nonpregnant state and like them depend on a neurodegenerative taint.

Psychoses occurring during pregnancy are of three types:

- (a) Insanity of pregnancy (11.38 per cent);
- (b) Manic-confusional insanity (46.4 per cent);
- (c) Lactational insanity (42.18 per cent).

One should speak of the insanities of this period for in addition to the manic-confusional state, there may occur acute mania, dementia precox or paresis, differing in no way from the same psychoses in the nonpuerperal state. Clouston has observed in one patient five recurrences of the manic-confusional form with an ultimate recovery. Bond reports a striking case where a true manic-state developed after the first baby, with recovery in six months; after a second baby with recovery in six months and after an operation for amputation of the uterine cervix also with recovery in eight months. Each successive attack accentuates the neurodegenerative taint and militates against recovery. "It is the patient not the parturition that," according to Langdon, "determines the type of mental disorder."

Dementia in pregnancy is rare; its occurrence indicates that an unrecognized or latent precox patient has become pregnant or that a latent paresis has become active as a result of the pregnancy. Persistent insomnia during pregnancy should be regarded with grave concern, especially in neurotic primipara; sleep must be secured or instrumental

delivery resorted to (Craig). Insane patients do not react to pain as a normal patient does and the nurse must be on the watch for retention of the urine, varicose veins and edema. An acutely insane women may not complain of labor pains. The manic-depressive form occurring during the puerperium usually recovers. In the manic-confusional type, if the patient does not die from exhaustion, recoveries occur in 80 per cent of the cases in from three months to a year. Insanity of lactation is of long duration. Langdon's admonition should be kept in mind, "Every puerperal woman is a potential infanticide." [Author's abstract.]

Weston, P. G. and Howard, M. Q. DETERMINATION OF SODIUM, POTASSIUM, CALCIUM AND MAGNESIUM, IN BLOOD AND SPINAL FLUID OF PATIENTS SUFFERING FROM MANIC-DEPRESSIVE INSANITY. [Am. Arch. of Neurology and Psychiatry, Aug., 1922, VIII, No. 2, p. 179. J. A. M. A.]

In order to determine whether the manic and depressed phases of manic-depressive insanity are associated with an alteration of the normal balance of sodium, potassium, calcium and magnesium in the blood and spinal fluid, analyses were made by Weston and Howard of these two fluids in seventeen cases of mania and in ten of depression. The average of these elements was practically the same in both states, and the individual variations from the average were small. The average sodium content of the blood and fluid in mania was 332 and 333 mg., respectively, and in depression, 330 and 328 mg., respectively. The results with potassium were also constant—mania, blood and fluid, 21.7 and 12.8 mg., respectively; depression, 22 and 12.7 mg., respectively. The blood and fluid calcium in mania was 10.4 and 5.2 mg., respectively, and in depression, 10.6 and 5.4 mg., respectively. Magnesium in mania showed 2.4 mg. for the blood and the same amount for the fluid; in depression the figures were 2.4 and 2.5 mg., respectively.

Münzer, Fr. Th. ARE THERE SPECIFIC ANTIGENS IN THE BLOOD OF CATATONICS? [Zschr. f. d. ges. Neur. u. Psych., LXXX, Nos. 1-4.]

Münzer could not confirm Geissler's results in showing specific antigens in catatonics either by the employment of precipitation, complement fixation or saturation tests with precipitins. The writer attributes Geissler's results to faults in the carrying out of his experiments.

Benon, R. RECURRING MENTAL DISTURBANCE IN DEGENERATES. [Bul. Méd., XXXVI, No. 20, p. 383. J. A. M. A.]

Benon warns to be on the lookout for this *délire des dégénérés* in subjects between eighteen and thirty presenting sudden asthenia and tendency to melancholia. In a case described, the two attacks with depression in the young man were most certainly not neurasthenia, dementia precox or a periodical psychosis. The attacks developed after

emotional stress, the asthenia, without known physical cause, becoming pronounced in a few hours, with illusions, hallucinations, headache, cold sweats and tendency to suicide.

Strecker, E. A. PRELIMINARY STUDY OF PRECIPITATING SITUATION IN TWO HUNDRED CASES OF MENTAL DISEASE. [Am. Journal of Psychiatry, I, No. 4, p. 503. J. A. M. A.]

Strecker's study embraces a comparison between 100 manic-depressive psychoses and 100 cases of dementia precox from the standpoint of the significance of the precipitating situations and a further comparison as to whether the organic or the psychogenic aspects were more emphatic. A significant or important precipitating situation occurred in fifty-two, or more than 25 per cent, of the patients. Influenza, overwork and exhaustion, the climacteric and complicated childbirth, were the most frequent somatic factors; the most common psychic problems were cruelty, poverty, illness and death of relatives, and unhappy love affairs. Significant and important exciting factors were more frequent by 12 per cent in manic-depressive psychosis; there was little difference between the two forms of mental disease in the doubtful and insignificant groups, but the absence of favoring circumstances was six times more frequent in schizophrenia. The proportion of somatic and psychic features was practically the same for manic-depressive and dementia precox; the somatic predominating in the significant and important situations; the psychic in the doubtful and insignificant ones. An abnormal personality occurred with greater frequency in those patients whose mental illness came on without adequate exciting factors. The percentage difference was 13 per cent for manic-depressive psychosis and 24 per cent for schizophrenia.

Sünner, P. PSYCHONEUROTIC INHERITANCE IN MANIC-DEPRESSIVE PSYCHOSIS ON THE BASIS OF THE DIEM-KOLLER ESTIMATE OF THE INHERITED INJURY. [Zschr. f. d. ges. Neurologie und Psychiatrie, LXXVII.]

Sünner finds through an investigation of 650 cases of manic-depressive psychosis that inheritance plays a much more important part in this disorder than in the groups thus far investigated by the Diem-Koller method (moderate mental disorder, health, general paresis, epilepsy).

Craig, Maurice. MENTAL DISORDER AND ITS PREVENTION. [Brit. Med. J., 1923.]

The recent writing and lectures of Sir Maurice Craig all point in the same direction; they show a desire to explore the various avenues whereby mental disorder may be prevented. His recent Bradshaw Lecture delivered before the Royal College of Physicians of London is yet another attempt to meet mental symptoms in the very earliest stages of their development, but it has a further intention in that it appeals

for the study of mental disturbance in ordinary physical disease. He opened his lecture by saying that "the close relationship of mind and body has long been recognized, but in practice this inter-relationship has been largely lost sight of and the tendency has been to investigate them apart to the detriment of our knowledge of each." One of the dangers in the practice of medicine is to concentrate one's attention upon what appears to be the most urgent symptom, for such a symptom may only be of importance in that it masks something which is all-important and it may be that the unobtrusive symptom is the one which is going to be the deciding factor in the ultimate fate of the patient. Mental changes there must be to a greater or lesser extent in all physical disease, but the power of adaptation varies in different individuals. What may be important in one may be of little moment in another, but this should not be left to good fortune, the physician should so study his patient as to know his mental and physical "make-up" and thus be able to appreciate in what direction danger may lie. The emotional type of man when nervously exhausted will react to emotion in a very different way from an individual whose nervous stability is great. The day has passed for treating the sick under a common standard, and the physician or surgeon who seeks to obtain the best results must take note of all the information that he can gather regarding the medical history of his patient.

Sir Maurice Craig proceeds to examine how and why mental symptoms develop in association with physical disease. He discusses in what way changes of sensation may be important and then deals with emotion. He shows how a vicious circle may be established, for example, by the emotion disturbing the vegetative nervous system and this in turn giving rise to a fresh group of exhaustion symptoms. When a condition of ill-health has been going on for some time it is by no means easy to discover where the primary fault lay, whereas in the early stages this may be a matter of comparative ease. A common example of this, as given by the lecturer, is that emotion, arising from whatever cause, may seriously affect the appetite and digestion, and if it persists, there may be steady deterioration in the body weight and in the general health of the patient, and yet it is common to see these conditions being treated as if the error in the digestion were the primary cause, and, as the lecturer states, the physician too often remains in complete ignorance of the fact that some disturbance of emotion is the real cause of the mischief. Sir Maurice Craig draws special attention to the importance of closer observation of those patients upon whom an operation is to be performed. He points out the danger of emotional shock either at the time that the individual is informed of the necessity to operate or at the time of the operation itself. He refers to the work of Crile and Lower as being of great importance in regard to this matter and well worthy of consideration. Although, as the lecturer says, child-

birth cannot properly be included in a thesis on physical disease, he felt that it was an opportune moment to refer to the part emotion may play in determining a mental breakdown at this time and how urgent it was to protect some women from the strain of emotion if this could be done.

Sir Maurice Craig lays special emphasis on the importance of sleep in disease and he reminded his audience how often this matter was neglected. He again draws attention to Crile's work and points out that sleep is the only real restorative to an exhausted organism. He refers to the growing dislike of giving hypnotics and adds "experience has taught me how dangerous is this outlook, for insufficient sleep—especially under certain conditions—is infinitely more damaging than any drug; as for the danger of inducing a habit by giving a hypnotic, if we omit the morphia and opium group, which should not be given, the risk is infinitesimally small." He charges the physician who puts off prescribing a hypnotic as long as possible with being the man who may bring about the habit he so much dreads, for he has by his methods permitted the patient to become obsessed with fear that he will not sleep, and when at last a drug is given and sleep obtained, the patient is terrified of the experience he has passed through and of ever again having a sleepless night.

From this he passes on to consider hallucinations and how, if perchance they should arise in association with physical disease, they may in turn give rise to mental disturbance through fear and emotion if the patient's mind is not quickly relieved by being told the nature of the phenomena.

The lecturer refers to gesture, expression and posture as indications of the mental state and he points out that to the truly observant person gesture language conveys as much as, if not more than, words, for the latter may be misleading, but the former seldom is, as it is the outward and visible sign of inward sensation and emotion. Physicians of long experience acquire the ability to read it, but he regards it as a matter of too much importance to be left for time to teach and he asks that the student should be trained to appreciate its meaning.

After referring to the endocrine system, Sir Maurice Craig once again impresses upon his hearers the importance of knowing mind and its reactions; he warns them against too much specializing and he concludes his address with the following words: "The physical hygiene of the future must include a knowledge of mental hygiene just as mental hygiene must take note of the welfare of the body. From this several advantages will accrue: mental processes will be better understood and mental changes will become matter of commonplace, fears of insanity will be replaced by an enlightened understanding, and the incidence of the graver forms of mental disorder will be lessened." [Author's abstract.]

Magenau, O. FORMS TAKEN BY THE PARANOID PSYCHOSES. CONTRIBUTION TO THE THEORY OF PARAPHRENIA. [Zschr. f. d. ges. Neur. u. Psych., LXXIX.]

Investigation of final schizophrenic states which began with delusional formation permits the author to designate certain groups, those in which the delusion of the acute psychosis still remains in the foreground, those in which the delusional formation changes with the "diffuse progressive depression," those in which the delusion completely corresponds with the paranoia, and others in which the delusion seems to be dependent upon manic-depressive phases. He could find no paraphrenias in Kraepelin's sense.

Kronfeld, A. SCHIZOPHRENIC ALTERATIONS OF THE CONSCIOUSNESS OF ACTIVITY. [Zschr. f. d. ges. Neur. u. Psych., LXXIV, Nos. 1-3.]

Kronfeld presents in a series of studies a broad survey of the psychotic primary symptoms as they manifest themselves to psychopathology; the relation of schizophrenia to these; the present day conception of schizophrenia; the phenomenology of the consciousness of activity, and the place of the ego in relation to these conceptions. Upon such a basis as this he then discusses the qualitative modifications of the consciousness of activity as structurally no different in the schizophrenic or the nonschizophrenic but views them as merely a genetic, secondary psychic course of events psychologically set in motion. They become schizophrenic only when the primary genetic release and the foundation are schizophrenic. The qualitative changes are the more frequent. The more rare primary failure of the consciousness of activity which is represented by the objective catatonic inhibitions, parakinetic and other psychomotor anomalies is to be considered as a true symptom of schizophrenia. The rifts in the continuity of experience here present belong, likewise, only to the psychotic process and distinguish this clearly from all characterological peculiarities and the efflorescence of the schizoid.

Bowman, K. M. BLOOD CHEMISTRY IN MENTAL DISEASES. [Am. Jl. of Psych., Jan., 1923, II, No. 3.]

Two hundred and twenty-nine cases of mental disease were examined by Bowman as to the blood constituents. The average findings for blood nonprotein nitrogen, dextrose, uric acid and chlorids were found to be normal for all types of mental disease, except psychoses with cardiorenal disease and general paralysis, both of which conditions showed increased findings for nonprotein nitrogen and dextrose.

Geier, T. A. THEORY OF PARANOIA. [Zschr. f. d. ges. Neur. u. Psych. LXXIX.]

Four cases of paranoia are given, according to Kraepelin's conception, as due to the development of abnormal personality. Geier believes

in a definite clinical picture and accepts a wish paranoia as existing without relation to other forms with delusion of persecution. He believes that there is a definite paranoid constitution.

Whitehorn, J. C. APORRHEGMA REACTIONS IN PSYCHOSES. [Am. J. of Psych., Jan., 1923, II, 3. J. A. M. A.]

The results presented by Whitehorn merely indicate that there is a tendency among some types of psychotic persons to give less than the usual normal reaction to histamin. The reaction appears to be sufficiently marked to encourage the hope that analytic procedures for the detection and estimation of certain aporrhegmas may yield information of value in the understanding of mental disorders.

Mayer-Gross, W. ACUTE PSYCHOSES WHICH HAVE RUN THEIR COURSE. A STUDY OF SCHIZOPHRENIA. [Zschr. f. d. ges. Neurol., LX, 160-212.]

The writer makes an attempt to bring some sort of classification into the wide field that lies between recovery with complete insight into the diseased condition and the continued existence of the disturbance, a classification which must be taken with some latitude as not applying equally in all cases. His basis is the after effect of experiences upon the self-valuation of the ego as found in a healthy person. The after-effect of a psychosis, too, is conditioned upon the end most advantageous to that personal valuation. He describes five forms of reaction for comparison basing his description upon a supposed case of a devoted husband whose wife has proved unfaithful thus causing his ego valuation to waver. He defines the forms of reaction thus: 1. Despair with a tendency to suicide as may appear after a psychosis. 2. "New life." The past disappears, the experience is not worked over, any new occasion is seized as the means of escape. After the psychosis there will be somatic residue of symptoms, headache, lassitude, sleeplessness, a neurotic or hysterical picture. 3. Shutting off of the experience. The deceived lives as if it had never happened, it is falsified in memory, "repressed." Here after the psychosis is seen the indifferent naïve attitude toward it. 4. Conversion. The deceived man recognizes the worthlessness of his wife. He no longer lives under an illusion. Everything formerly despised, neglected, has its value reversed and this rescues him from his crisis. After the psychosis, *e.g.*, the brutal drunkard becomes a firm sectarian. 5. Identification. There is a sense of his own guilt or share in the wife's guilt which is punished justly by heaven. The psychosis is considered as a divine visitation. Despair, "new life" and conversion belong to an earlier age, shutting out and identification to the later years.

BOOK REVIEWS

Cattell, H. W. INTERNATIONAL CLINICS. Vol. III. Thirty-third Series. [J. B. Lippincott, Philadelphia and London.]

Of interest to the neuropsychiatrist in this volume of this excellent series of monographs may be pointed out: Berkeley's paper on Thyroid Therapeutics; Petty and Sherrill's study on Blood Sugar Estimation; Bowers on the Psychology of the Unconscious; Moore's Prevention of Mental Breakdown, and Cattell's remarks on Hanging. Walsh's historical reminders of the many therapies for pain is interesting and instructive and free from propaganda.

Stekel, Wilhelm. PECULIARITIES OF BEHAVIOR. Two volumes. Translated by J. van Teslaar. [Boni & Liveright, New York. \$8.50.]

Stekel is one of the most prolific of writers in the field of psychopathology. The present translation is from the third edition of one of his works on Disorders of the Emotions and Instincts, a program of ten volumes in the original German.

Wandering Mania, Dipsomania, Cleptomania, Pyromania and Allied Impulsive Acts are the chapters which van Teslaar has picked out of the original to translate.

These "Parapathic" disorders, as Stekel has termed them, are of enormous clinical and social significance. Turn where one will, in the street, in the school, in the marts of commerce, everywhere, the discerning eye meets with minor or major manifestations of modified behavior which are either crippling to individual capacity or met with severe disapprobation, even legal restriction, by the community. Indices of a sick social body, the mass reaction of that same herd seeks to punish what the individual of the herd himself combats within his own inner organization, as a stigma which would threaten his own evolutionary idealism.

It is high time that these situations be met in the open as objects of earnest study and therapeutic effort, instead of permitting them to be grossly mishandled by stupid pedagogues or corrupt political legal machinery which would fatten on their manifestations and "pass the buck" to the "public" who pays the bills.

As Mr. Mencken would say, "It is a glorious system."

Whereas we are not entirely convinced that Stekel has given us the best solution, at all events he has conscientiously studied the phenomena, and has contributed clinical material of much value.

These volumes must be read with much discrimination. Whole truths, half truths, and no truths, we feel, are more or less commin-

gled, but in the large here are pregnant problems which need better formulae than society has yet evolved for their handling.

In the large process of mental and social evolution with its flotsam and jetsam these two works can be utilized towards better goals, and as such are to be reservedly recommended.

Wimmer, August. CHRONIC EPIDEMIC ENCEPHALITIS. With a Preface by Sir Frederick W. Mott. [William Heinemann, London.]

In recent years two situations in the medical field have demanded almost the exclusive interest of research efforts over the entire civilized medical world. The internists have had Insulin and the neuro-psychiatrists Epidemic Encephalitis. Both have opened up illimitable vistas of practical and theoretical interest.

As Sir Frederick Mott notes in his charming introduction, the occurrence of this disorder is appallingly frequent in Great Britain, and since it has seemed to have been shown that the encephalitis virus continues to act upon the human organism after the acute disorder has passed, the consideration of chronic epidemic encephalitis is one of great value, and fortunately met by this incomparable monograph.

We are in entire accord with Mott's judgment when he writes that it is a most lucid, scientific, and practical discussion of the problems which arise in the later course of epidemic encephalitis. Wimmer has had a large clinical experience and he has turned his excellent clinic in Copenhagen to the study of this protean syndrome which has resulted in this splendid undertaking.

The book is written in a very delightful style, and we are greatly indebted to Professor Wimmer for putting it into English form. This "*maladie à surprises et à reprises*," as he, quoting French aphorism, so aptly puts it, has received from him a very clever and full presentation. His discussion of Intermediary Types is most fecund and illuminating, and his chapter on Pathophysiological Mechanisms quite superb. It is one of the outstanding products of the year and merits a wide reading.

Purves-Stewart, James. THE DIAGNOSIS OF NERVOUS DISEASES. Sixth Edition. Revised. [Edward Arnold, London. E. B. Treat & Co., New York. \$10.]

The present edition, greatly revised, has quite suddenly expanded into a volume of 650 pages, undoubtedly a reaction to its continued and merited success. Apart from Dejerine's monumental monograph, no really valuable work on symptomatology and diagnosis is in the field. This work of Purves-Stewart is the nearest rival.

There are large and valuable textbooks but there is a need of orienting texts on examination, interpretation of symptoms, and differentiation of clinical pictures, syndromes, and medleys which in large measure this for the most part excellent work fulfills.

The new edition has been rigidly pruned, largely rewritten, particularly the chapters on the Neuroses and Psychoneuroses, which they

certainly needed, and a chapter on "delirium" has been added in which important psychotic deliria are omitted.

When we come to examine the new rewriting of the psychoneuroses we find the author disputatious and affective. He spends much space on criticism of certain trends in recent psychopathology, whereas as much heat might readily be shown in almost every chapter of his book if the various conflicting views were brought in apposition. We regard these chapters as unworthy of the general objective attitude taken elsewhere in this really admirable book. Psychopathology in the large is to the author a closed book. He singles out one transcendent evolution in this field and vents his spleen upon it, entirely ignorant of much of the discussion in the field during the past twenty years. "Psychasthenia" as a classification is adopted, although it has ceased to have any relevancy for some years. These chapters, although rewritten, are still as far behind the standards of modern psychopathology as if the whole of his organic neurology rested at the Charcot level. This simply shows that the author has little insight into the field of psychiatry—a characteristic of the old organic school of neurology. Yet on the whole the book is so replete with information, and valuable at that, that it were a minor cavil to quarrel with the author's scotomata in the psychiatric field, a field of so wide a scope that it is little wonder that the author should fail to encompass it, especially when so well grounded in mechanistic fields of organic neurology.

Schilder, Paul. MEDIZINISCHE PSYCHOLOGIE FÜR AERZTE UND PSYCHOLOGEN. [Julius Springer, Berlin. \$2.90.]

Schilder has been extraordinarily prolific in recent years in a vast variety of directions in the neuropsychiatric field, and his work has been marked by much originality as well as sound clinical teaching.

The present medical psychology is one of his best generalized productions. It strikes a definitely new note in psychology which has already begun to be sounded in the masterly work of Bleuler, the valuable though more restricted work of Kretschmer, the great monograph of Binswanger, and the somewhat difficult but intriguing volume by Kronfeld.

Of all of these the most definitely clinical work is the present one. After an illuminating and stimulating introduction he discusses "Perception" in most of its modalities. What sets it off from most presentations of perception is its rich inclusion of pathological observations, giving it a roundness and completeness almost never found in the academic psychologies, which for the most part leave the clinician cold because of their aloofness from the realities with which he is surrounded. The doctor is not interested in carefully worked out desk orations. He observes a great mosaic of peculiar phenomena for the understanding of which "normal" psychology is hardly more than a colossal joke. Behavior and Speech as a special type of Behavior makes up chapter three. This is quite understandable for the clinician, as Schilder has worked it out on the general reflex-

tropistic scheme. Memory, also a chapter, becomes quite simple in this presentation, and the products of memory and habitual response lead to the chapter on the "Instinctive Types of Behavior." Here the fundamentals of the Race and Personality (Ego) forces are treated in a masterly manner and Freud's far-reaching formulations made of practical use. The final chapters deal with the Ego and Personality and the Affective Strivings of Human Beings.

Here is a psychology of fundamental value for the student of human beings in their daily life of success and failure. It will not be understood by the ancients and the standpatters, but will be valued by the curious, the searchers, and those who recognize the complexities of human behavior, and who seek to understand and guide them in the service of health and happiness.

Leyser, E. HERZKRANKHEITEN UND PSYCHOSEN. [S. Karger, Berlin. 4 mk.]

A clinical study of the relationships between cardiac disease and psychotic manifestations from Sommer's clinic in Giessen and Kleist's clinic at Frankfurt, being Vol. 25 of Bonhoeffer's well-known "Abhandlungen."

This last named author, as is well known, has always been sympathetic to the study of the symptomatic psychoses with organic components, and we have here developed along strictly descriptive lines a masterly small monograph bearing up the cardiogenic types of psychotic manifestations as they are seen from the cardiac point of view. Although Adler's suggestive work on psychical compensations for organic inferiorities is mentioned in this monograph, we miss, almost entirely, the working out of the psychogenic factors of fear and their relations to the "unconscious" which has occupied so much of the attention of the psychoanalytic school. We feel certain that the author could have gone deeper and given a monograph which would have lasted for a long time as a model in this most fascinating field.

Rauch, Maximilian. DIE FUNKTIONSPRÜFUNG DES AKUSTISCHEN UND STATISCHEN LABYRINTHS. [Julius Springer, Wien und Berlin. \$.60.]

For one seeking a short, reliable, and practical series of tests for the functional capacities of an acoustic and static labyrinth this small monograph is to be most heartily recommended.

Strümpell, Adolf. LEITFADEN FÜR DIE UNTERSUCHUNG UND DIAGNOSTIK DER WICHTIGSTEN NERVENKRANKHEITEN. [F. C. W. Vogel, Leipzig. 6 mk.]

A book of 150 octavo pages designed to meet the needs of the beginner in neurology, the student of medicine, or for the busy practitioner who would the more easily orient himself to some of the major problems in this complicated region.

It is to be noted that Strümpell here lays particular stress upon

the so-called functional neuroses because of their compelling frequency in the practice of medicine.

An interesting little book, sound and to the point, and much superior to the run of these easy roads to knowledge, for Strümpell is too well grounded to write a poor book. It can be cordially recommended.

Stekel, Wilhelm. DER FETISCHISMUS. [Urban u. Schwarzenberg, Leipzig u. Wien.]

Of all the figures that stand out in the development of the Freudian school, *pro* and *con*, Stekel can least of all be neglected. Even though Freud himself has indicated his conservative position with reference to one of his earliest pupils, the literary productiveness of Stekel demands attention and appraisal.

As one, even superficially, regards the many fat tomes, first, second, and even third editions of works of over 500 pages, of this author, it is to be observed that there must be something behind all this, for even a demagogue cannot retain his prestige for so long a period without there being a very definite value behind his productivity.

The superficial observer is little interested in the deepest concerns of life's underlying forces. That is what makes him satisfied with the obvious, and caters to his essential lack of scientific curiosity. Stekel will have none of this, and probes deeper and deeper into the intricacies of the anomalous in order to cast light upon the kaleidoscopic varieties of life's appearances. To him nothing is without some significance, and the special trend of this volume is to ascertain the deeper roots of man's displacement over to apparently trivial objects, the deepest concern of the creative instinct. The sexual instinct is the general term for *that which* has brought ameba to man; hence the most vital and fundamental of all the trends of biological significance.

Those special aberrations of this "that which" which clinically show themselves as "fetishism" are here most interestingly portrayed, not from the armchair of the imaginative writer who would tell us how Nature ought to act, but from the clinician who gathers information how she does behave.

Fetishism is essentially a masturbatory displacement phenomenon. The fetish represents not a heterosexual goal, but an autoerotic, homosexual, and sadomasochistic expression of a repressed infantile fixation. Extreme eroticism and extreme piety (holiness) are inextricably entangled. The eroticism is largely unconscious, the piety conscious.

Stekel shows the complexity of the phenomena and leads us to believe that only the psychoanalytic technic can disentangle the web of conscious and unconscious rationalization.

This is one of the most valuable of recent monographs upon the complexities of the sexual instinct, and it is singularly fortunate that parts of this monograph will soon be available in translation.

Cowdry, Edmund V. GENERAL CYTOLOGY. A Textbook of Cellular Structure and Function for Students of Biology and Medicine. [The University of Chicago Press, Chicago, Ill. \$7.50.]

This is a volume of collected studies, edited by Cowdry and written by eminent specialists in cytology, such as R. Chambers, E. G. Conklin, E. V. Cowdry, M. H. Jacobs, E. E. Just, M. R. Lewis, W. H. Lewis, F. R. Lillie, R. S. Lillie, C. E. McClung, A. P. Matthews, T. H. Morgan, and E. B. Wilson. It is a remarkable coöperative effort in showing the general results of modern cytological research, both structural and functional, in all of their practical bearings on biological phenomena, and hence fundamental for the study of general physiology and pathology.

This presentation is unique not only by reason of its having been written by the ablest of American students in this branch of study but because of its masterly unification of aim and synthesis of the best work in this field. The respective authors have all worked at the Wood's Hole Marine Biological Laboratory, thus permitting a perfected plan to have been followed out which is rare.

Wilson has contributed the opening chapter. It is a short but valuable introduction giving the chief historical steps which have culminated in the present-day mosaic of knowledge of this fundamental aspect of biology. Albert P. Matthews has written a very comprehensive review of the Chemistry of Cells. The biochemist has become an electrical engineer still striving to unravel the intricacies of the marvelous battery which nature has been perfecting for a billion years or more. This chapter is further enlightened by the fact that Matthews recognizes what others have termed the psychical element of life. He takes the concept and deals with it in a most illuminating manner, even stating that the psychologist of the future will deal with the psychology of the elements in their combinations and permutations. This material and psychical interrelationship is acknowledged as operating at the biochemical level and stamps this contribution as one of incomparable interest and suggestiveness. Here may be found some intimation of what living "energy" really is.

M. H. Jacobs writes a fascinating chapter on the Permeability of the Cell to Diffusing Substances; Ralph Lillie, one on Reactivity of the Cell: The Physical Structure of Protoplasm; and E. V. Cowdry, one on the Cytological Constituents, with an especially valuable bibliography. Warren and Margaret Lewis contribute a study on The Behavior of Cells in Tissue Cultures, the significance of which is just beginning to be appreciated. Fertilization is discussed by Frank Lillie and E. E. Just in Section VIII, which is followed by a masterly résumé on Cellular Differentiation by E. G. Conklin, much more mechanistic than Matthews' formulations. McClung has a splendid chapter on the Chromosome Theory of Heredity, and T. H. Morgan completes the structure by a section on Mendelian Heredity.

Taken all in all, this is one of the best pieces of work of this type which can be found in any language.

Barany, Robert. DIE RADIKALOPERATION DES OHRES. [Franz Deuticke, Leipzig und Wien.]

The brain surgeon and otologist are both concerned in this masterly presentation of the radical operation for mastoiditis. Barany has given a unique historical introduction concerning the development of this operation and then supplemented it by a detailed discussion of his own experience in this field.

Kronfeld, Arthur, SEXUALPATHOLOGIE. [Franz Deuticke, Leipzig und Wien.]

Attention has already been called to the larger work of Aschaffenberg's "Handbuch der Psychiatrie," seventh abtheilung, of which Kronfeld's chapter is but a part. We call renewed attention to this section because of its general importance and by reason of the fact that the author has given a large review of the whole problem which some critics have been inclined to feel has been too narrowly limited by the psychoanalytic adherents.

To all students of the problem of the evolutionary development of the instinct of reproduction, seen from many divergent attitudes, this singularly scholarly presentation is to be recommended.

Stekel, W., Missriegler, A., u. Wittels, F. FORTSCHITTE DER SEXUALWISSENSCHAFT UND PSYCHOANALYSE. Erster Band. [Franz Deuticke, Leipzig und Wien.]

In spite of the many gratuitous and blatant prophecies concerning the early demise of psychoanalysis, not only in the United States but also in Europe, the literature grows apace both in extension and intension. Evidence of this is this new year book which some of the split-off Freudians have inaugurated and here published as a volume of some 420 pages.

It is spoken of in the "Vorwort" as a year book of the "independent psychoanalysts" and the editors purpose to give it a purely clinical character in contradistinction, as they term it, to the meta-psychological tendencies of the purer Freudian adherents.

In reality it is to be interpreted as a product of the Stekel school, the relationship of which to the Freudian school has been most entertainingly discussed by Wittels in his study of Freud, as seen through a Temperament (already reviewed in these pages).

There are seventeen studies here set forth, five by Stekel, on Polyphonie des Denkens, Epileptische Symptomen Komplex, Eine merkwürdige Schlafstörung, Ein Fall von Katalepsie, In Memoriam Herbert Silberer. Other studies are by Philip Graven, Fr. Heberer, Fr. Wittels, Sonnenschein, Missriegler, Gerster, Guthert, Tremmel, Leo Kaplan, and E. Geijerstam.

The chief interests in this volume are those dealing with the epilepsy problem, and in view of the difficulties concerning this syndromy the contributions are worthy of reading. Graven's study of epilepsy is especially detailed and tends to support the work of the psychoanalytic school. Heberer, Wittels, Sonnenschein, and

Missriegler all contribute interesting papers to the same general subject, especially to the "narcolepsy" problem. Heberer's account of a cure of a twenty-two-year-old epileptic is quite striking and deserves more notice than can be given here.

To the working student of analytic inclinations here is a large amount of suggestive material. We cannot appraise it in detail. We can only be thankful that the evidence is set before us. Bacon has reminded us that "Truth is the daughter of Time, and not of Authority." Observation and record is the first requisite for any appraisal. We wish the new venture success.

Kirchoff, Theodor F. DEUTSCHE IRRENAERZTE. Zweite Band. [Julius Springer, Berlin.]

Shortly after this work went to the printer the gifted author died of a cardiac disorder and a brief note of his life is added to this continuation of the life histories of noted German psychiatrists.

We have had occasion to praise the first volume of this series of biographical sketches; this second is even more noteworthy. It contains longer and shorter biographies of Griesinger, Leidesdorf, Laehr, Sr., Sprillmann, Leubuscher, Munde, Nasse, Erlenmeyer, Gudden, Gutsch, Brosius, Zinn, Wahrendorff, Ludwig, Meyer, L., Ganster, Schlager, Kahlbaum, Scholz, Cramer, Westphal, Koeppel, Meynert, Wille, Arndt, Weber, Pelman, Hitzig, Sander, Mendel, Kirn, Grashey, Jastrowitz, Kraft-Ebing, Schüle, Koch, Tiling, Alter, Hecker, Dittmar, Samt, Jolly, Emminghaus, Bandorf, Knecht, Wernicke, Fürstner, Bumm, Moeli, Kroemer, Naেকে, Wildermuth, Möbius, Lehmann, Thomsen, Nissl, Cramer, A., Alzheimer, Brodmann, Heilbronner, and Kirchoff.

There are portrait reproductions of nearly all of these well-known teachers of psychiatry and excellent exposés of their contributions to the science which above all has had a wider and deeper development in Germany than anywhere else in the world.

We welcome this most delightful work, which all students of psychiatry should know is available.

Ferraro, Armando. ÉTUDE ANATOMIQUE DU SYSTÈME NERVEUX CENTRAL D'UN CHIEN DONT LE PALLIUM A ÉTÉ ENLEVÉ. [Zuidam, Utrecht.]

This is a further contribution from Professor Winkler's laboratory of the anatomical findings in a decerebrated dog which was made the subject of physiological experiments already reported by Pavlov at the Edinburgh Physiological Congress of 1923. Rothmann's celebrated decerebrate dog was also studied in Winkler's laboratory and made the basis of a similar study by Rothmann's son. This has been published in the *Zeit. f. d. ges. Neur. u. Psychiatrie* in 1923-1924.

Professor M. Zeligson had operated upon this present dog and the pieces turned over to Ferraro are made the subject of this thesis, aided by the "Remmert Adriaan Laan" fund. Dr. Ada Potter, whose splendid atlas is well known, made many of the photographic reproductions which richly illustrate the work.

The details of this study cannot be entered into here, nor have we the space to give the author's important résumé of the anatomical deductions drawn from this study or the discussion which the chief neuroanatomists have contributed since the Goltz experiment inaugurated this important type of research. These are all carefully considered and the research is one of fundamental significance in this field.

Graber, Gustav Hans. DIE AMBIVALENZ DES KINDES. Imago Bücher VI. [Internationale Psychoanalytischer Verlag, Leipzig, Wien, Zurich.]

Another interesting volume of the "Imago" series. Beginning with Bleuler's conception of Ambivalence, in its intellectual and affective trends, a formulation of greater precision than the more popular term polarity, or bipolarity, favored by Stekel, the author first shows the significance of Freud's applications of the conception at deeper ontogenetic levels of activity as well as its applicability in phyletic settings. He then would apply these more penetrating glimpses of the principle in the interpretation of infantile behavior, first endeavoring to separate what may be heredity from fortuitous or accidental occurrence through the application of the conception, Child, as subject, object, and all, gives way to the development of the object world and the flow of libido into it. This development the author briefly traces through the primary hate and its ambivalent binding to the outside object, of which the parents are the first images. Now comes genital differentiation adjustments and the prohibitions put upon pleasure seeking with the Oedipus situation becoming more and more real. Throughout these pages the author weaves illustrative case material showing the application of the ambivalent trends in all of the respective situations.

His chapter on symbol formation as a response to the tension of the libido and its repression is particularly useful. Another chapter, on Animal Phobias, is also of much interest. The dreams of children are also presented as offering confirmation of the applicability of the ambivalent principle.

This small work is full of suggestive material for the psychoanalytic worker or for the psychologist or psychiatrist at all up to date on the study of unconscious dynamics.

Frank, Ludwig. SEELENLEBEN UND RECHTSPRECHUNG. [Grethlein & Co., Zurich and Leipzig.]

This present volume has come into existence because of a request of president of the Zurich Court that the author should deliver a series of lectures upon the disturbances of the emotions to the members of the county, municipal, and local courts in order to enable them the more reasonably to deal, as justices, with the problems of their special functioning. The more complicated questions of the psychoses have only been partly included.

The growing contacts between neuropsychiatry and the law are here well set forth, and it would be a large hope to express that American jurisprudence would pattern after this example. That it has commenced to do so in the children's courts and in the psychiatric clinics in connection with our courts is an excellent sign that the legal fraternity are fundamentally as desirous of learning more of the psychological foundations of behavior as are their Swiss confreres.

Here is a book filled with practical material in which this liaison justifies itself. We hope to see it translated and thus added to the small literature which is growing with us in this country.

Adler, Alfred. PRAXIS UND THEORIE DER INDIVIDUALPSYCHOLOGIE. [J. F. Bergmann, München, 1924.]

This is a second rewritten and enlarged edition of a collection of this author's writings from about 1912 on. They have recently partly appeared in translation in the International Library of Psychology, Philosophy and Scientific Methods which has been reviewed in these pages. We can only repeat that with Adler's "Organ Inferiority," and its further elucidation in "The Neurotic Character," he has said all that he has ever had thus far to contribute, and all of his later writings have been repetitions and polemical.

Cattell, Henry W. INTERNATIONAL CLINICS. Vol. II, 33, Series 1923. [J. B. Lippincott Company, Philadelphia and London.]

This volume contains some interesting papers on Insulin, one being by McPhedran and Banting.

Of interest to neuropsychiatry are papers by I. D. Hubbard, on The Continuous Bath and the Affective Psychoses; T. V. Moore, on the Pathology of the Will; John E. Lind, on Late Nervous and Mental Sequelae of Epidemic Encephalitis; and by James Burnett, on Chorea.

Rutot, A., and Schaerer, M. LE MÉCANISME DE LA SURVIE. [Felix Alcan, Paris.]

A book saying nothing new but in general attempting to offer some support to Richet's general ideas of metapsychic phenomena. Were the authors, as well as Richet, Lodge, Doyle, or any of the psychic researchers, better oriented to the simplest problems of psychopathology the entire fabric of their logic would be seen in an entirely different light.

N. B.—All business communications should be made to *Journal of Nervous and Mental Disease*, 64 West 56th St., New York.

All editorial communications should be made to Dr. Smith Ely Jelliffe, Managing Editor, 64 West 56th St., New York.

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ORIGINAL ARTICLES

THE EXPERIMENTAL STUDY OF THE ROMBERG SIGN

BY FRANKLIN SMITH FEARING

(From the Psychological Laboratory, Stanford University)

Introduction. The distinction must be made, in the discussion of the general subject of equilibration, between the ability of the individual to maintain his body erect (static equilibrium), and the bodily phenomena which accompany and succeed rotation of the organism. The modern interest in the experimental study of equilibration has in the main been concerned with the latter phase, and received its initial impulse in the testing and training of aviation recruits during the Great War.

Disturbances of the individual's ability to maintain an erect bodily posture are of clinical significance as indicative of the functional integrity of the proprioceptive system. Romberg was the first clinician to point out the inability of patients suffering from tabes dorsalis to stand erect with the eyes closed. In 1851 (37) he writes:

If he (the patient) is ordered to close his eyes while in the erect posture, he at once commences to totter and swing from side to side; the insecurity of his gait also exhibits itself more in the dark. It is now ten years since I pointed out this pathognomic sign, and it is a symptom which I have not observed in other paralyzes. . . . Since then I have found it in a considerable number of patients, from far and near, who have applied for my advice; in no case have I found it wanting.

The testing for ability to maintain balance has since become one of the routine procedures in neurological examinations. Regarding the administering of this test Dana (8, p. 56) says:

Muscular, articular, and tendinous anesthesia usually exist together; such ataxia shows itself in standing and in locomotion and other voluntary

movements. Thus we have a static ataxia and locomotor or motor ataxia. Static ataxia, or inability to stand (or sit) without swaying or irregular movements, is tested by making the patient stand with the eyes closed and the heels and toes close together. Normally, the head moves not over an inch in this position, and the patient holds the head and body more rigid with the eyes closed than with them opened. In ataxic states the reverse is true, and decided swaying or even complete loss of equilibrium occurs with the eyes closed, or even with the eyes open, and the base narrowed by putting the feet together. This phenomenon is called the "Brauch-Romberg symptom." In static ataxia, muscular and articular sensations are both involved.

Church and Peterson (6, p. 29) refer to it in the following terms:

Standing with the eyes closed and the feet together, reducing the base of support, is often attended in spinal and nervous diseases with swaying of the body and a tendency to fall. This constitutes static ataxia and is known as the Romberg symptom. It may be graphically recorded by attaching a writing point to the patient's head, which traces his ataxic movements on a prepared surface at the proper level. Having the patient walk backward with closed eyes or stand on one foot increases the ataxia.

Aside from its clinical use, static equilibrium, considered as a psychosomatic response, has attracted the interest of the physiologist and psychologist, and it is the purpose of this paper to review the experimental advances made upon this problem.¹

EARLY PHYSIOLOGICAL STUDIES

The function of the maintenance of posture has been variously described by such phrases as *static sense* (Külpe, 25, p. 146), *sensations of orientation* (Mach, 28, p. 282), *ampullar* and *vestibular sense* (Titchener, 39, p. 174), *labyrinthine sensation* (Myers, 34, p. 64; Starling, 38, p. 651), *sense of equilibrium* and *spatial sense*. These terms all have to do with the knowledge of the position of the body in space or more specifically with the maintenance of balance.

While Romberg was the first clinician to point out the diagnostic significance of the inability of the individual to maintain an erect posture, the problem of equilibration had received some experimental attention from earlier investigators. These investigators were interested in the study of static equilibrium from the point of view of the mechanics of the body and the location of the center of gravity.

¹ An exhaustive review of the literature on equilibrium is not attempted. The titles in the bibliography at the end of this article represent some of the more important experimental studies of static equilibrium.

It is perhaps significant of the change of emphasis in physiology that the modern texts and systematic treatises (Starling, Bayliss, Howell) contain no chapters on the mechanics of the body and their discussion of equilibration is chiefly confined to the topics of semi-circular and vestibular functions.

This preclinical interest in static equilibrium from the point of view of bodily mechanics is to be found in the work of the Weber brothers (44) and Johannes Alphonsus Borellus (2), who were interested in determining the location of the center of gravity of the body. Braun and Fischer (3) were interested in defining the normal erect posture (*normal stellung*). This interest in the *normal stellung* developed from the study of the "attention position" from the point of view of military hygiene. Vierordt (40), Leitersdorffer (26) and others studied this problem.² Luciani (27) says of Vierordt's findings (Vol. III, 113):

He (Vierordt) found that the anterior-posterior and lateral oscillations are considerably greater in the symmetrical military posture than when the weight was thrown upon the one leg (asymmetrical). The latter posture is accordingly the most natural, and preference is given to it in sculpture and painting.

Vierordt is credited (Luciani, III, p. 113) with being the first investigator to make graphic registration of sway. However, the first formal experimental study of static equilibrium as such was made by Hinsdale (21) in Weir Mitchell's clinic in 1887. Mitchell and Lewis (32) had published a previous paper on the tendon jerk in which sway was incidentally discussed, and it was at Mitchell's suggestion that Hinsdale's study was made. Mitchell already had made equilibrium data objective and quantitative. He says (p. 370):

(In connection with station in locomotor ataxia.) For this we select station, the relative power to stand steady, with eyes open or shut. This symptom can be made numerically accurate by standing the patient in front of a bar marked in inches, and placed on a level with the ears. The extent of lateral sway of the head may thus be easily observed; a like observation records the anterior tendency. The first is rarely over half an inch in health, the second does not usually exceed an inch, even with closed eyes. Any large increase is suspicious.

Hinsdale studied the sway of adults and children. His method of graphically recording sway is described as follows:

² The work of Leitersdorffer is briefly discussed by Zuntz and Loewy (45).

. . . attaching to the top of the man's head a flat piece of cardboard, upon which was stretched some smoked paper. The subject was then placed under an index which was free to move up and down in a fixed line, and which traced curves on the paper as the subject who stood beneath swayed in any direction.

Hinsdale notes that no one was found who could stand absolutely still, "the body swayed forward and backward, and from side to side, in every instance." His important conclusions were as follows: (1) normal sway is "about one inch in the forward and backline, and three quarters of an inch laterally," (2) children sway more than adults, (3) closing eyes increases sway about 50 per cent, (4) ether exaggerates sway, (5) the "law of rhythmical motion" governs sway of man.

In 1890 Hinsdale published a second paper (22) in which station was studied in reference to respiration. He found no observable relation.

In 1888 Bullard and Brackett (4) studied the static equilibrium of 181 men, using the graphic method of recording their data. They note that the anterior-posterior is greater than the lateral sway.

PSYCHOLOGICAL STUDIES

Hinsdale, Mitchell and Lewis, Bullard and Brackett were interested in sway as a *clinical* phenomenon. Such aspects of the problem of static equilibrium as the perception of changes in equilibrium and the accuracy of the individual's adjustment thereto, and the analysis of the sensational components of equilibrium, dizziness and rotation with a view to determining whether or not there exists a separate sense quality which may be assigned to the vestibular end organs, are *psychological* in character. An adequate summary of the older work in connection with the perception of changes in equilibrium may be found in Nagel (35) where there is a discussion of the work of Aubert and Delage upon the perception of tilt, including a cut of their apparatus. Modern investigations in this direction are found in the work of Burtt (5) and Gartens (14).

The analysis of the sensational components of equilibrium and dizziness has received some attention. Warren (43) studied the problem in connection with rotation. Griffith (15) studied dizziness and finds no evidence for a separate sense quality. Titchener (39) states the psychological difficulties (p. 174):

The study of the semi-circular canals and the vestibule presents a curious difficulty to psychology, a difficulty the reverse of that which we

have just met in our discussion of the sensitivity of muscle, tendon and joint. There we had a tangled complex of sensations, and the problem was to distribute them among the available end-organs. Here we have highly developed end-organs, but no very obvious group of sensations to refer to them.

The psychologist's interest in static equilibrium has not been confined to the above lines of work. Static equilibrium has furnished an index of the neuromuscular state of the body. Hancock (19) used sway as a means of studying the motor ability of children, Bolton (1) and Wallin (42) used it in connection with the intelligence of children and mental defectives.

Course of Nervous Impulse Involved in Equilibratory Response. The problem of the relationship existing between the equilibratory response brought about by the functioning of the non-acoustic portion of the inner ear and the response dependent upon afferent nerve endings in the muscles and joints may be clarified by the consideration of the course of the nervous impulses involved in these two systems.

Studies of the functioning of the non-acoustic labyrinth have accumulated in a literature of vast proportions.³ We may only mention a long list of contributors beginning with the work of Flourens (1828) who may be said to be the founder of the modern theories of the function of the non-acoustic labyrinth. Following Flourens there are the contributions of Goltz (1870), Breuer (1872), von Cyon (1873), Crum Brown (1874), Mach (1874-76), James (1882), Kreidl (1892), Ewald (1887-89), (1892-96) and others. These studies are the forerunners of the later work on rotational equilibration. It is impossible to give space to this literature here, since it is mainly concerned with changes in the bodily accompaniments of rotation, and the relation of these changes to theories of the functions of the non-acoustic portions of the inner ear. We are concerned with the problem of equilibration in relation to bodily effects of rotation only in so far as those effects may be duplicated in static equilibrium.

The large literature in connection with the nervous tracts involved need not be reviewed, except to say that our knowledge of these tracts is fairly certain. The course of the nervous impulses leading to the equilibratory response is outlined in Chart I⁴ and II.

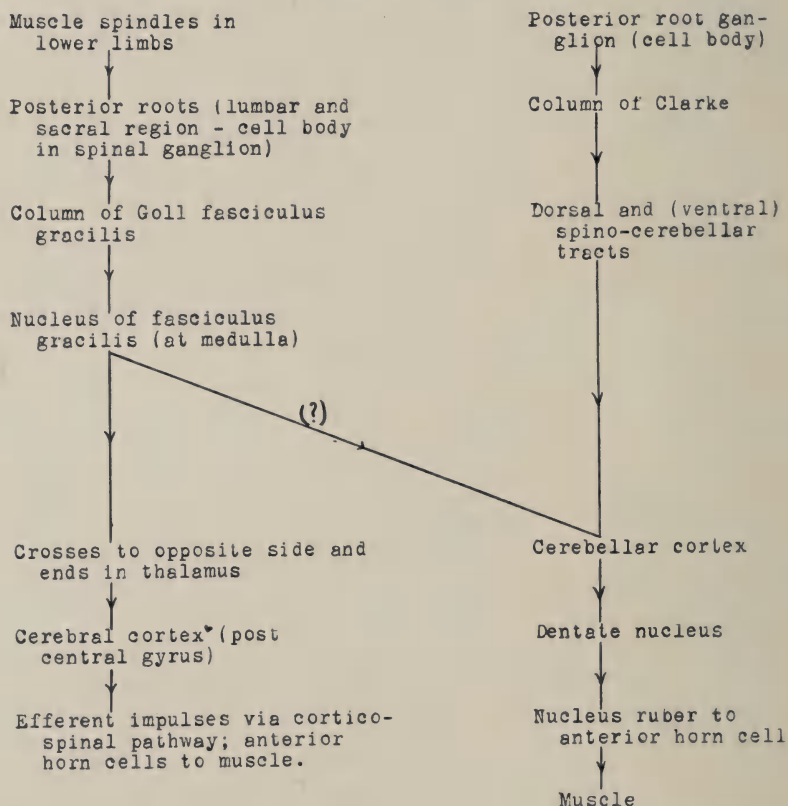
³ Griffith (16) has a critical review of this literature.

⁴ See Villiger (41, p. 186ff). The writer desires to acknowledge his very great indebtedness to Professor C. S. Stoltenberg of the Department of Human Anatomy of Stanford University, for assistance in the preparation of these charts.

When the posterior columns are involved there is a loss of the muscular sense or kinesthesia. Kinesthesia, of course, means a conscious awareness of muscular movement. That portion of the tract which involves the cerebellum is uninfluenced by consciousness and thus satisfies the conditions of a simple reflex. The relation of

CHART I

COURSE OF THE NERVOUS IMPULSE LEADING TO THE EQUILIBRATORY RESPONSE AS DEPENDENT UPON AFFERENT IMPULSES FROM MUSCLES AND JOINTS.



conscious awareness to the maintenance of equilibrium is of some theoretical importance, since if equilibrium is assumed to be a reflex response conscious control is reduced, presumably, to a minimum. The maintenance of muscular tonus is accompanied by a low degree of conscious awareness; it is the non-acoustic labyrinth and cerebellum which are mainly concerned with muscle tonus. There would seem

to be reason for believing, then, that the only pure reflex components of static equilibrium are those concerned with muscle tone.

Sway may be considered as (1) a reflex response initiated by nervous impulses arising in the non-acoustic labyrinth, (2) a conscious response dependent upon kinesthetic, cutaneous, visual and auditory

CHART II

COURSE OF THE NERVOUS IMPULSE LEADING TO THE EQUILIBRATORY RESPONSE AS DEPENDENT UPON VESTIBULAR SYSTEM.

Sensory endings in maculae acusticae of utricle and saccule,
and in cristae acusticae of the semi-circular canals.

Bi-polar cells of vestibular ganglion located within
internal auditory meatus

Vestibular Nerve

1. Superior vestibular nuclei
2. Medial " "
3. Nucleus of the spinal vestibular tract
4. Lateral vestibular nuclei (Deiters Nucleus)

Cerebellum (through this
may have cerebral connections)

Vestibulo-spinal tract

Anterior horn cells to
skeletal muscle

Medial longitudinal fasciculus where they
divide into ascending
and descending branches

Twigs are given off to
nuclei of oculo-motor,
trochlear and abducens
nerves and to anterior
gray column of cervical
region.

Motor neurons from oculo-
motor, trochlear, abducens,
accessory and cervical
spinal nerves to muscles
which move head and eyes.

cues, (3) a response in part dependent upon reflex connections with receptors in the ampulae and vestibule and in part dependent upon voluntary responses to the sensory cues outlined in (2), or (4) a reflex response initiated in the muscles and joints and passing via the posterior column to the cerebellum. Inspection of the charts will make clear the probable course of the impulses in these situations.

There are other possibilities in the various combinations of the elements just outlined.

Our charts do not, of course, cover all the possible sources of stimulation involved. Vision is of great importance, but it is usually ruled out when static equilibrium is studied under laboratory conditions by requiring the subject to close his eyes. In addition to the vestibular and kinesthetic components, there are in the soles of the feet cutaneous sources of stimulation for the maintenance of equilibrium.⁵ Certain later experimental studies indicate that the more important components are presented in our charts.

It is clear from the inspection of the charts that the equilibratory response may not be regarded as a specific response to a specific stimulus. That the response may be carried out without the intervention of consciousness is made clear by Head (20) in the following paragraph:

The afferent stream from deep structures, passing up the posterior column of the spinal cord, can affect two terminal centers. One of these is the cortex, with consequent recognition of posture and movement; the other, the cerebellar system, regulates and controls the postural and tonic aspects of muscular activity without in any way exciting consciousness directly. We know that some part of our body has assumed a certain position, or that a definite movement is taking place under the influence of the will; but the preliminary coördination of muscle-groups and shifting of tonic innervation, necessary for such changes, are carried on without the accompaniment of any conscious process.

Morat (33, p. 376, 379) has emphasized the fact that equilibration is a neuromuscular response involving many structures:

Equilibration is not a specific sense, but a function which appeals to several senses; there are as many ways of compromising it as there are senses taking part in it; the deficiency of each of these may be more or less covered up by the supplementing and compensating action of the subsisting senses. . . .

Thus we see that, in order to bring about the motor effect by which equilibrium is ensured, the cerebellum gathers impulses from several senses. In the first place it receives them through the vestibular nerve from a special apparatus annexed to the sense of hearing; the semi-circular canals. . . . It is thence that the individual obtains his images of the cephalic attitude, which are due to the analyses effected by the ampullary nerve of the internal ear.

The cerebellum, on the other hand, receives impulses from two impor-

⁵ Both Miles (31) and Hinsdale (21) report an increase in amount of sway when the subject removes his shoes. In the case of an artist's model, however, Miles reports that there is an increase in sway when the shoes are worn. The factor of habituation is important in this connection.

tant senses, the visual and the tactile sense; from the latter it receives both superficial and deep impulses, especially deep ones coming to it from the muscles and the articulations themselves. These furnish the individual with the images of his segmentary attitudes.

Obersteiner (36) in 1899 pointed out the intimate relationship existing between the visual and muscle sense, and the vestibular function. Cleghorn (7) emphasizes the fact that the maintenance of equilibrium is due to the coöperation of several senses, but believes that the semicircular canals are of primary importance. Jones (24) regards the "kinetic-static labyrinth" as the essential organ of equilibration, although he admits that "perfect equilibration is accomplished through an harmonious coöperation of . . . the eye, the muscle-sense and most particularly the kinetic-static sense." The assumption of Jones would seem to be that equilibrium is a simple unmodifiable response. As we shall see there is some reason to doubt both the primacy of the semicircular canals in the maintenance of static equilibrium, and the assumption of the unmodifiability of this response.

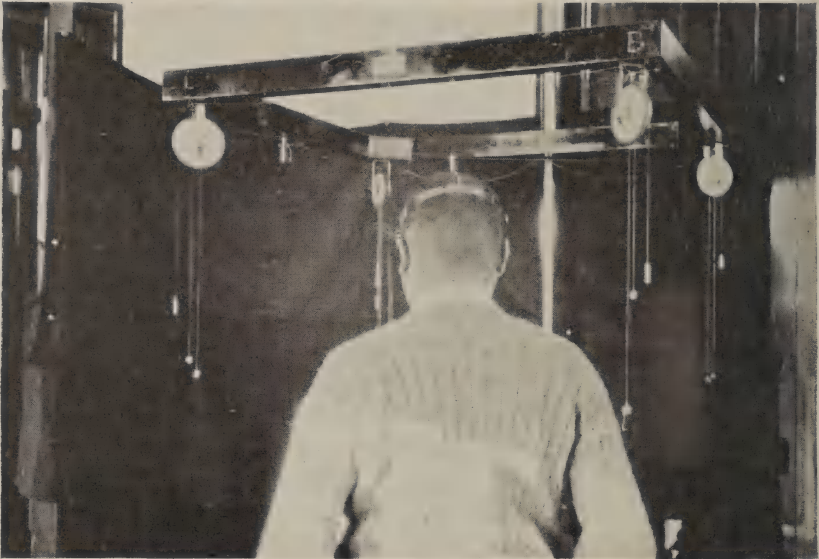
It is clear, then, that the two important neural systems which have to do with equilibrium are the vestibular and the system involving the afferent paths from the muscles and joints. The latter seem to be more susceptible to cortical influences than the former. To what extent they are dependent upon each other does not seem to be clear from the present data. However, in the maintenance of static equilibrium, the afferent paths from muscles and joints (particularly the lower limbs) would seem to be as essential as the vestibular system, since disturbances of kinesthesia are accompanied by gross disturbances in equilibrium.

The work on semicircular function in connection with the rotation of the human organism (Dodge [9], Dunlap [10], Griffith [18]) would seem to make it impossible to longer regard these responses (nystagmus) as a simple unmodifiable reflex. Howell (23, p. 400) and others have pointed out that equilibrium is only temporarily disturbed by destruction of the canals. Maxwell (29) has shown that in the case of rabbits there is a reduction and final disappearance of both nystagmic times and nystagmic movements with repeated daily rotations. Griffith (18) has been able to reduce the nystagmic time of rats. Some unpublished data in possession of the writer show a marked reduction in time and number of movements with repeated rotation of pigeons.

Experimental Modification of Static Equilibration. The question

may be raised as to whether we may expect static equilibrium to show a like susceptibility to experimental modification. If static equilibrium is a neuromuscular function dependent upon the activity of several senses and to some extent under conscious control, then it must be subject, like other such complex responses, to experimental modification.

It is as such a function that Miles approached the problem. Graphic methods of registration of sway had been used by previous investigators. Miles (31) has pointed out some of the objections to



THE ATAXIAMETER WITH THE SUBJECT IN POSITION FOR MAKING RECORD OF
AMOUNT OF SWAY.

(Reproduced through the courtesy of the *Journal of Comparative Psychology*)

the graphic method of registration which may be summarized as follows: (1) The tracings cannot be easily measured so as to give the total length of path traversed, and (2) the recording needle, unless very carefully adjusted, is apt to make some noise while in contact with the smoked surface, thus affording secondary cues to the subject. In connection with the essential features in the measurement of station the following is a pertinent quotation from Miles' paper (p. 317):

A graphic record of station theoretically provides three or more features which represent the swaying of the body during the test period. These are (a) extreme scatter or range of area covered, (b) actual length

of the path traversed, and (c) number of movements or oscillatory rate of movement. The ideal score would be a combination and proper weighting of all of these. . . . The tracings on smoked paper, even though greatly magnified by projection, cannot be satisfactorily measured by a map tracer or similar method because of the utter confusion of the lines. The authors just cited have contented themselves with measuring the extreme range of movement along the anterior-posterior axis and likewise along the lateral axis. . . . Some mechanical means of automatically summing up all of the movements in terms of their anterior-posterior and lateral components thus appears desirable.

The apparatus ⁶ described by Miles (called the ataxiameter) consists of a square wooden frame approximately 70 cm. on a side at the corners of which are movement adders so constructed that they turn only in one direction. A silk thread passing over the groove in these adders is connected with a helmet which is placed on the head of the subject who stands in the center of the wooden frame (see Figure 1). Thus any movement of the subject turns one or more of the adders. The adders are calibrated and the number of millimeters of movement may be read directly. The forward, backward, left and right movements are recorded independently on the adders, thus enabling the operator to analyze the sway of the subject into its lateral and anterior-posterior components. The height of the wooden frame may be adjusted to the height of the subject.

In connection with the neuromuscular aspect of sway Miles (p. 325) says:

It is not surprising, then, that in maintaining erect posture with eyes closed, one is conscious of only kinesthetic and tactual impressions. The labyrinth must be assumed to be functioning during station probably by increasing the muscular tonus. It is doubtful if the slight changes in tilt during standing are sufficient stimuli to cause it to initiate different compensatory movements. . . . Thus, there is provided a rather slight opportunity to stimulate a receptor mechanism which never supplies better than vague, weak impressions, even the existence of which are in doubt as sensory data. We are therefore warranted in considering station as primarily a test of muscular equilibrium against gravity.

With the use of the ataxiameter Miles found sixteen adult men to give an average score of 745 mm. of sway in two minutes for the 45 degree position of the feet (V position); eleven adult women gave an average score of 731 mm. of sway. Regarding the factors which influence station, Miles mentions height, weight, position of the feet, type of footwear, sex, and age as important. He

⁶ This apparatus may be purchased from Mr. Warren E. Collins, 584 Huntington Avenue, Boston, Mass. A cut with full structural details may be found in Miles' paper.

points out the importance of the visual factor in the maintenance of equilibrium and finds that in the case of one subject there was an improvement (reduction) of approximately 45 per cent in amount of sway with the eyes open. Regarding the relative effect of the kinesthetic (muscle sense) and purely labyrinthine elements in equilibration the following is a pertinent quotation (p. 324):

We shall not be able, figuratively, to close the eyes of the "kinetic-static sense." These impressions from the labyrinth are bound to function along with the great mass of kinesthetic sensations. Their relative prominence and importance in the test are of interest that we may have a clearer idea of what is being measured in station. In the first place, it is instructive to notice the experience of the young aviator who is practically helpless if he has to fly in the dark or in a cloud and cannot use his vision by which to correct the position of his plane with the horizon. . . . Ideally the labyrinth should be able to take care of just such conditions, but practically any impressions from it are not sufficiently strong to be a sure basis for orientation. Similarly in *tabes dorsalis* kinesthetic sensations are reduced or arrested. The tabetic can stand with some stability while he can see, but in the dark or with eyes closed the impressions from the labyrinth are too vague or weak to suffice.

Regarding improvement in station with training Miles finds that it, like all voluntary neuromuscular performances, improves with training, but that it improves rather less than the average of such tests. In conclusion, Miles suggests that station as measured by the ataxiometer may be used to test neuromuscular efficiency.

Sway was used by Miles in his monographic study on the effects of alcohol on human efficiency (30) as one of the battery of tests for neuromuscular performance. Regarding its use in this connection he says (p. 24):

While unsteadiness of gait and of standing posture is the symptom most usually associated with alcoholic intoxication, yet this characteristic sign of the effect of alcohol on motor control seems never to have claimed much attention in laboratory studies on the influence of moderate amounts of alcohol. The "Romberg sign" was early recognized as of special importance in certain diseases and has been used in various forms, but mostly as a clinical diagnostic symptom.

For the purpose of measuring sway in this study, the ataxiometer was used, and while it is impossible to enter into an analysis of the technique and results, it may be stated that "after an alcohol dose, an increase in wavering as compared with the results after the control dose was found with all of the subjects at a time approximately sixty-five minutes following the ingestion (about 20 per cent).

Most of the subjects also showed some increase in wavering earlier and later than this time.”⁷

In 1914 Maloney (24a) described an instrument for recording the amount of sway in the sagittal and frontal planes, which he calls the cephalograph. This instrument is so arranged that a patient suffering from tabes may observe the amount of his sway as it is graphically recorded on a chart in front of him, thus giving him an opportunity to correct tendencies toward marked postural instability. No illustrative data are given in connection with this instrument.

The present writer, in his work on static equilibrium (Fearing, 11, 12, 13), took as his point of departure the work of Miles. The Miles ataxiometer (see Figure) was used in all studies. Two minute periods were used, and the subjects stood with eyes closed in all the experiments. In the first paper (13) it was the purpose of the study to make “(1) a quantitative analysis of the lateral and anterior-posterior sway in a group of normal adults with reference to certain factors, particularly height, weight, and position of the feet, and (2) an analysis of the record of amount of sway of a single individual over an extended period of time (approximately seven months) primarily for the purpose of determining practice effects on the posterior-anterior and lateral components and total sway, and secondarily to collect evidence as to the existence of rhythm.” One hundred and sixteen subjects were used—thirty-six women and eighty men—all of whom were students at Stanford University. Standardized typed instructions were given the subjects when they reported for the experiment. Two two-minute periods of sway were registered by each subject, one period, the first in every case, with the subject’s feet in the V-position (angle of 45 degrees), and one period with the heels and toes together (the so-called Romberg position). The subject’s height and weight were measured at the time of the experiment. With these subjects the median amount of sway for both men and women in the V-position of the feet was 937.5 mm. (965 mm. for the men and 888 mm. for the women); in the Romberg position of the feet it was 1,205 mm. (1,232 mm. for the men and 1,133 mm. for the women). Regarding the relative amount of sway in the anterior-posterior and lateral planes, it was found that there was always more sway in the anterior-posterior plane, regardless of the position of the feet. The coefficient of correlation (Pearson product moment formula) between amount

⁷ In this monograph the effect of the ingestion of alcohol on sway is discussed on pages 135, 238, and 243. The technique of the sway experiments is described on pages 24-26.

of sway and height and weight was computed. It was found that there is a positive correlation with amount of sway for both these factors—especially for height—but that the correlations were of a relatively low order of magnitude.⁸

In connection with the records of the single subject—a woman—taken over a long period of time (seven months) there was some evidence of a rhythm which apparently coincided with the menstrual cycles of the subject.

In the second study of Fearing (12) the effects of practice upon amount and direction of sway were investigated. A group of sixteen subjects were practiced three times a week for approximately two months. The conclusion of Miles that sway is subject to a certain amount of improvement with training was borne out. The subjects used in this study made introspective reports of the experience during the experimental periods, with especial reference to the cues to which they reacted. The most important sources of sensory cues were the calves of the legs and the soles of the feet—the former giving keen kinesthetic and the latter cutaneous experience.

In the third study of Fearing (11) the effect of controlled and uncontrolled attention upon sway was investigated. In the early studies there had been some suggestion that the total sway score was affected when the subject directed his attention to the sway situation or gave it to matters extraneous to the situation during the test periods. To quote from this paper:

The distinction between “controlled” and “uncontrolled” attention is expressed in the difference between the situation in which the reagent has a task which, in popular language, definitely “occupies” his attention during the critical periods, and the situation in which no particular task is set.

In terms of the experimental situation the difference between controlled and uncontrolled attention was determined by the introduction of a systematic auditory distraction in one experimental series. This distraction took the form of a series of taps, sounded at irregular intervals during the sway period, which the subject was instructed to count, and report the total. In the second series of experiments no distraction was introduced and no instructions were given regarding the direction of the subject's attention. One hundred and twenty subjects, sixty in the distraction series and sixty in the control series, were used. There was a reduction in the amount of

⁸ The correlation between weight and amount of sway in the V-position was $+0.19$ (P.E. 0.06); between height and sway in the V-position was $+0.20$ (P.E. 0.06).

sway in both series of experiments, but in the series in which a distraction was introduced the reduction was much greater. In other words, the control of attention, *i.e.*, systematically directing it towards some object extraneous to the sway situation, reduced very appreciably the amount of sway.

For the clinician the results of these three experimental studies of static equilibrium may be briefly summarized as follows: (1) Static equilibrium as represented by sway is affected by such factors as height, weight, and position of the feet—the affect of height and weight being much less than the affect of the position of the feet. The Romberg position (heels and toes together) is more unstable than the V-position of the feet. (2) Static equilibrium is affected (as is any neuromuscular response) by practice; the effect, however, is not as great as in most neuromuscular activities. (3) Static equilibrium is affected by the direction of attention—the “control” of attention tends to reduce the amount of sway. The last two conclusions point to factors which have been ignored to a large extent in the clinical use of the Romberg sign.

Summary. We have attempted to review some of the phases through which the experimental study of static equilibrium has passed. It has been pointed out that the early interest in the subject was directed towards the locomotor mechanics and the location of the center of gravity. The latter studies of static equilibrium have been in the nature of studies of motor adjustment rather than the study of the activity of a specific sense mode. There is now available apparatus—the Miles ataxiometer—which makes it possible to obtain graphic and quantitative records of sway for either clinical or experimental uses. Using this instrument, experimental studies have been made of static equilibrium which have shown that it is subject to modification by various physical and psychical factors. In connection with the modification of static equilibrium by continued practice, we find that in this respect it resembles the change following the continued rotation of the organism. In the former case there is a reduction in the amount of sway; in the latter case there is a reduction and final disappearance of the nystagmus times.

Our consideration of the course of the nervous impulse has indicated that static equilibrium cannot be a response of the simple reflex type, but that it involves the integrated activity of at least two neural paths. This is borne out by the failure of subjects to report any sensory experience characteristic of static equilibrium such as a “static sense.” In the present state of our knowledge of the neural mechanisms underlying the psychical processes and complicated

behavior patterns of such a response as the maintenance of equilibrium, we cannot draw any conclusions as to the neurological relationship existing between the vestibular and kinesthetic (afferent tract from muscles to cerebellum and cortex) systems. Nor can we offer any final explanation as to the neurological situation underlying such phenomena as the reduction in amount of sway accompanying the control of the subject's attention, and the reduction in amount of sway with continued practice. It may be that when attention is deflected from the sway situation there is an opportunity for the purely reflex components in the maintenance of balance to function more directly and efficiently.

Problems are set for the coöperative research of the neurologist and psychologist. The study of the static equilibrium in the case of various types of nervous diseases with varying degrees of spinal involvement should lead to results of both theoretical and practical interest. The study of attention with reference to reflex activity, both in connection with the maintenance of equilibrium and the simpler reflexes, *e.g.*, knee jerk, is suggested.

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HUNTINGTON'S CHOREA IN A TWIN CHILD CASE REPORT

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In 1816 Thilenius recorded a case of hereditary chorea, and during the next two and a half decades similar cases were recorded by Rufs, Gorman, Lyon, and others. Their reports were interesting but were lacking in detailed description as well as the necessary genealogical tracing to establish the familial nature of the disease. In 1872 Dr. George Huntington recorded several cases which had been observed and studied by his grandfather, father, and himself in succeeding generations of certain families on Long Island and established beyond a reasonable doubt the hereditary as well as the familial nature of the disease. Because of their studies and clear description of the disease it has since borne the name of Huntington's chorea. Numerous other cases have been recorded since Huntington's memorable report substantiating his observations, and while the malady is by no means of common occurrence, it is observed with sufficient frequency to be recognized without difficulty.

Despite the fact that Huntington's chorea has been recognized for many years as a distinct disease entity, the etiology is but little better known than when the disease was first described. The chief determinants appear to behave as Mendelian dominants, but it is impossible to say which child of choreic parents will be similarly afflicted or which child will escape the malady entirely. Some observers have claimed to show a law of anticipation (Mott, Davenport), but this is in need of more material. It is stated that the disease does occur earlier in females than in males, and that the female is less frequently affected. Moreover, it has been noted that the disease may skip one generation only to reappear in the next. This is also questionable, and Jelliffe has given some data to show that when this occurs there may be gaps concerning the parentage not recorded. It would seem advisable always to advise against marriage of any person whose parents have been afflicted with Huntington's chorea.

The majority of cases observed thus far have been in patients who did not present any symptoms of the malady until they had arrived

at adult life. Persons who have become afflicted at an earlier period are very rare, and it is for this reason that the following case is presented:

White female, age seven years. A twin child, native of Georgia. Complaints were incoördination of movements, defective speech and gait, retarded physically and mentally. Duration of three years. Observed at the Good Samaritan Clinic in Atlanta, Georgia.

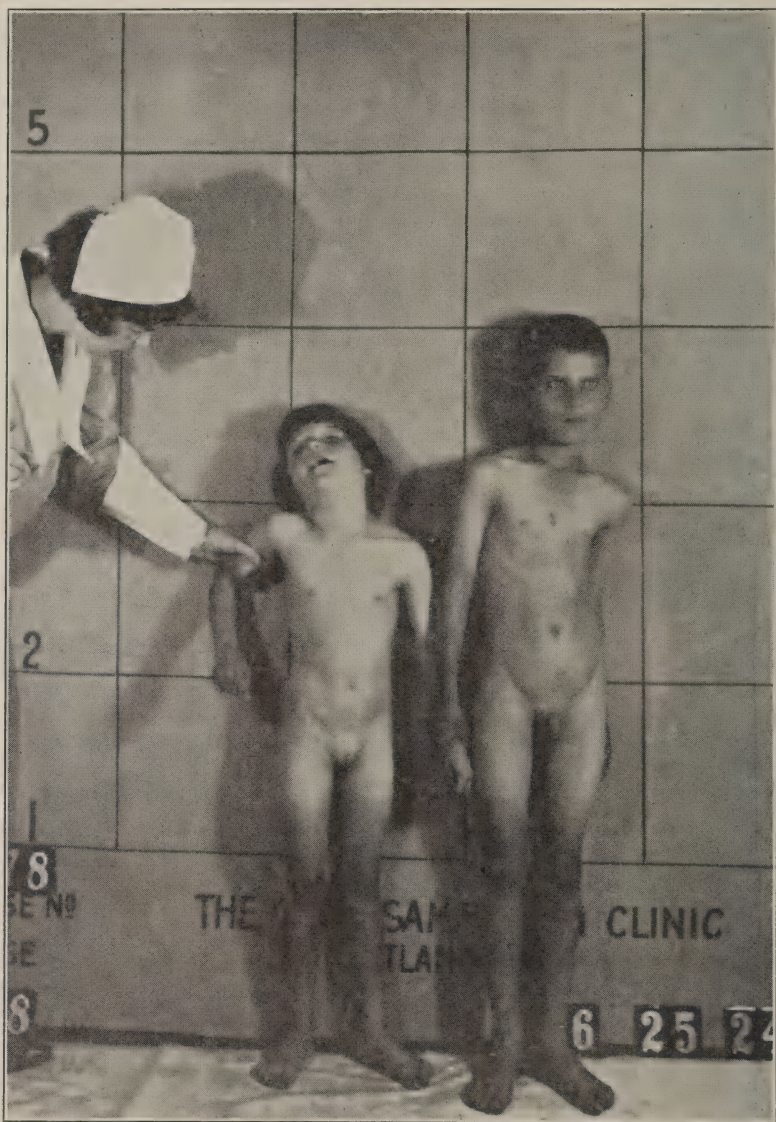
Family History: Her paternal great grandfather was afflicted with a disease which was described as Huntington's chorea. Nothing could be learned of his ancestry, collaterals or progeny, other than the patient's paternal grandfather who was similarly afflicted and died in an insane asylum at the age of thirty-seven. He had four children; two of whom, an uncle and aunt of the patient, showed the syndrome after reaching adult life and subsequently died at the State Sanitarium for the Insane at Milledgeville, Ga. Another child, an aunt of the patient, is now thirty-five years of age and is healthy. The remaining offspring, the father of the patient, is living at the age of thirty-seven, but was first afflicted with Huntington's chorea about ten years ago. He is now an inmate of the State Sanitarium where he is gradually deteriorating mentally and physically.

The patient has four sisters living and healthy. Three are older and one younger than herself. Her twin brother is living and apparently normal in all respects. There is no history of any nervous, mental or hereditary disorders occurring in the maternal ancestry of the patient.

Past History: She was born after nine months of gestation. The delivery was normal and no accidents were noted. She crawled at seven months and the first tooth appeared at about the same time. She sat alone at eight months, walked at eleven months and talked at twenty months. Her twin brother, however, crawled at seven months, had his first tooth at five months, walked at ten months and talked at twelve months; thus showing the patient to be constitutionally inferior to her brother from the beginning. Her mother states that otherwise the patient developed normally and appeared to her to be both mentally and physically about the same as her twin until the present trouble begun. In 1917 the patient had a very slight attack of the measles. No other ill's have been noted.

About three years ago she sustained a slight fall while running across the floor and bumped her head, but since there was no loss of consciousness nor abrasions this was not regarded as consequential until some choreic movements of the head and neck were noted shortly thereafter. These movements have gradually progressed until the present when the trunk and limbs are also involved. Her physical development became retarded at about the time the first symptoms were noted and since that time her twin has outgrown her. She also began to show a mental sluggishness at an early period of the disease and while she is not stupid or imbecilic her cerebration is decidedly slower than normal. She appears to be sensitive and shy and does not play with the other children. Her gait is awkward and stumbling thereby causing her to sustain many falls and minor injuries. Her sleep is unbroken and she is not disturbed by any choreic movements during the night. Her mother states that she has good and bad days in so far as the symptoms are concerned. After the development of the disease she became

greatly attached to her father and avoided all other members of her family until he was sent to the State Sanitarium.



The patient in characteristic pose. Difference in development can be noted between the patient and her twin brother.

Her physical examination reveals her to be 107 cm. in height, wt. 43 lbs., torso meas. 57 cm., long. meas. 50 cm., span. 107 cm; no localized obesities; head type oval; size large; scalp negative; hair fine and oily;

neck short; skin moist, soft and no secondary markings; vision O. D. normal, O. S. normal; pupillary reactions normal; muscles normal; slight congestion of conjunctiva; fundus: nerve head normal; vessels normal; retinae normal; ears normal; tonsils removed in August, 1923; no adenoids; sinuses normal; thyroid not palpable; teeth normal; heart, lungs and abdomen are normal; external genitals appear normal; knee kicks present; other deep and superficial reflexes are normal; no Babinski; no Romberg; choreic movements noted over head, neck, body and limbs; no glandular enlargements; speech sluggish and somewhat indistinct; gait stumbling; no ataxia; no spasticity; no paralysis, no atrophies, no other abnormalities of the nervous system.

LABORATORY

Urinalysis

Turbidity	Slightly cloudy
Color	Straw
Amount	S. S.
Reactional (acid)	67
Specific gravity	1027
Albumin	Negative
Sugar	Negative
Indican	Negative
Diazo reaction	Negative
Acetone, diacetic acid	Negative

Microscopical

Crystals	Many uric acid
Mucus	Many threads
Erythrocytes	Occasional
Squamous epithelia	Many
Other epithelia	Many

Feces—The gross specimen consisted of a semisolid stool, with few particles of undigested food. The slide presented a field consisting of many triple phosphate crystals, many vegetable cells, and a few mucous threads. Negative for blood, pus, ova, and parasites.

Malaria blood—Negative

Blood

White blood count	6,100
Red blood count	3,960,000
Hemoglobin	80 per cent
Color index	1.0
P. M. N.	79
P. M. E.	1
P. M. B.	9
Large mono.	2
Small mono.	9

Wassermann reaction—Negative

X-ray Examination—Photograph was unsatisfactory because of inability of patient to coöperate.

The symptomatology presented in this case is so classical that her mother and other members of the family recognized it as being the same as that appearing in her uncle, aunt, and father, therefore no attempts will be made to differentiate it from similar conditions. The fact that the disease had appeared in three succeeding generations

of ancestors would confirm the familial nature of the disease. The early appearance of the symptoms of the disease in this patient may be the subject for many observations. Certainly it would enhance the generalization that the disease occurs earlier in females than in males. The retardation of her mental and physical development occurring coincidentally with the appearance of the first symptoms of the disease, as well as her slowness in beginning to walk and talk, would seem to indicate that some structural changes existed from embryonic life. The fact that procreation occurred after her father had presented well marked symptoms of Huntington's chorea, and the absence of symptoms in her twin, who is of opposite sex, is noteworthy. Altogether the case presents a rather fertile field for study, and it is to be hoped that she, as well as all other members of her immediate family, can be kept under observation for a long period of time.

MALIGNANT SPHENO-OCCIPITAL CHORDOMA *

REPORT OF CASE

BY JOHN L. ECKEL, M.D., AND WM. F. JACOBS, M.D.

BUFFALO, N. Y.

Chordoma arises from remains of the primitive chorda dorsalis, which normally undergoes degeneration, except small rests known as the nuclei pulposi, which are found in the center of the intervertebral discs. Frequently remains may also be found at the junction of the sacro-coccygeal bones, and at the base of the skull at the sphenoccipital synchondrosis (Clivus Blumenbachii).

As a result of some irritation the cells of these rest or remains may overgrow, resulting in tumor formation. The greater number of these are small and benign, and produce no symptoms, but occasionally they become large, undergo malignant changes and produce serious symptoms, and death.

Luschka (1) was the first to call attention to this condition. He described a lobulated, soft and jellylike mass projecting from the clivus into the skull which had perforated the dura. The following year Virchow (2) described one projecting from the sphenoccipital synchondrosis and thought it of cartilaginous formation, with softening and vesicular degeneration of the cells. He applied the name "ecchondrosis physaliphora" to the mass. The next year H. Müller (3), after a careful comparative anatomy study, showed that the masses were of notochordal origin.

Ribbert (4) confirmed Müller's views, and was the first to apply the name Chordoma to the tumor mass. Hennig (5) described the first case arising from the sacro-coccygeal region. The vast majority of these masses are small, and Ribbert found them in about 2 per cent of cases coming to autopsy, while Burrow and Stewart (6), who recently made a careful study of 200 autopsies, found them present in a somewhat less proportion, 1½ per cent of cases.

* From the Wards and Laboratory of Pathology of The Buffalo City Hospital.

Read in abstract before the New York Neurological Society, April 1, 1924.

REPORT OF CASE

J. K., male, forty-nine, widower, pipe fitter. Born in the U. S. Admitted to Buffalo City Hospital August 28, 1923, and died there November 12, 1923.

F. H. Negative as to nervous disease. His wife died some years previous of cancer.

P. H. Had measles and mumps in childhood. Pneumonia in 1901. Following this several severe attacks of tonsillitis; developed empyema in 1918, for which an operation was done and he made a good recovery. He denies syphilis; admits gonorrhea. There were no children.

Present Illness: In October, 1921, he consulted a physician at one of the health centers for dizziness and headache. The headache was described as a feeling of fullness, and was claimed to be severe in the back of the head, and he stated that it was throbbing in character at times. When the headache became severe he was dizzy. At this time it was noted he had many bad teeth, which were later removed. There was also a profuse nasopharyngeal discharge, and he complained of marked constipation and some blurring of vision in left eye. His blood pressure at this time was 152 systolic, 80 diastolic.

In November, 1921, he returned to the health center and complained that he had recently marked pains along the posterior cervical region, and that movements of the head on the neck were painful in all directions.

Nothing more was heard from him until August of 1922, nearly a year later. At this time he complained of attacks of light-headedness, and stated that his legs had been weak for some time; that he tired easily, and was depressed. He complained of hot sensations, running from the head down through the chest. He claimed inability to work since the summer of 1921 because of weakness and dizziness.

Nothing more was heard from him until his admission to the City Hospital in August, 1923. He stated that nine months ago he had the sensation of numbness and tingling in the fourth and fifth fingers of the left hand; this condition remained stationary for a while, and then spread over the hand and up the forearm. At about the same time numbness and tingling began in the right hand. About three months before admission there was some numbness of the feet; this, however, was not marked. During the four months previous to admission, he lost 30 pounds in weight, and associated with this there was a gradual and progressive weakness of the extremities, until he became unable to walk for several weeks.

There had been no vomiting, no difficulty in swallowing, the vision had long since cleared up. There had been no recent marked headache. He claimed that incontinence of urine developed shortly before admission. There had been no edema of extremities, no cyanosis, no difficulty with breathing, but there was some speech difficulty.

Examination at this time resulted in finding a man of large frame, in a fair state of nourishment. There was very little voluntary motion of the extremities possible. The pupils were round, equal and the irides reacted promptly; no disturbance of eye movements; eye grounds normal both sides; vision normal; smell and taste normal. There was no disturbance of sensation over the face. There was slight clumsiness of motion of the lower facial muscles, both sides; hearing was normal; vocal cords normal.

There was considerable atrophy with fibrillary tremor of the tongue. There was no enlargement of the thyroid gland. There was some pain in the neck on movements of the head in all directions. He complained of tenderness along the cervical spine. Mentally he was clear. Speech somewhat indistinct.

Arms: Very limited voluntary motion at shoulders, elbows and wrists. There was ataxia of finger-finger and finger-nose tests, more marked on left side; some dysmetria of the left hand was present; the power of both hands was practically gone; there was absence of all forms of sensation to the elbows; above this point he could occasionally distinguish between hot and cold and pain. This was present only in areas. There was slight wasting of the muscles of both arms including the shoulder group of muscles. The biceps and triceps and supinator longus reflexes were all present, and very active, equal on the two sides.

Lower Extremities: He was unable to stand, but had some ability to raise the legs from the bed and flex them slightly at the hip and knee. The knee and ankle jerks were present, equal on the two sides, and very active. There was no ankle clonus. On the left he showed an inconstant Babinski; later, one was also present on the right. There was marked diminution of superficial sensation to the knees, less marked above this. It was impossible to test for ataxia, as he had not sufficient power retained in the muscles. The cremasteric reflex was absent.

Spine: Apparently this was normal throughout, except for tenderness in the cervical region.

Chest: The heart was normal in size and position; pulse 90 and regular; vessels slightly thickened; there were no murmurs. Blood pressure 104 systolic, 70 diastolic. The lungs were clear throughout.

Abdomen: Both upper and lower reflexes absent. There were no masses felt. He had to be catheterized.

Laboratory Examination: Hemaglobin 90 per cent; red count 4,020,000; white count 7,100. Blood Wassermann was negative to all antigens. Spinal fluid was clear, four cells per cm. A negative globulin and a negative Wassermann test. The gold sol curve was normal. Urine was normal throughout. Blood chemistry gave 12.6 mg. per 100 c.c. of blood. Uric acid was 4.2 mg. Creatinine was 0.63 mg. and sugar was 110 mg. An X-ray of the skull was made at this time, taken from both sides, and also a stereo. The report was negative. Diagnosis of probable tumor at base, involving upper cervical portion of cord was made.

During the following three months in the hospital his symptoms gradually progressed. After one month there was no voluntary motion in either the arms or legs. He complained of marked stiffness of the legs and spasmodic jerkings present. Superficial sensation of the skin became more diminished and involved the trunk as well as the extremities. The deep sensibility also became impaired, in that the toe position sense, vibration sense, localization sense, joint and muscle sense, were all involved. The speech became more difficult, and after the second month in the hospital swallowing became difficult and the tremor and atrophy of the tongue increased. There were no new cranial nerves involved. During the last eight weeks in the hospital he had to be fed. On November 8th he developed pneumonia and died November 12, 1923.

PATHOLOGICAL REPORT

The autopsy was performed twenty-four hours after death. The external examination yielded nothing remarkable except a distinct atrophy of the muscles of the lower extremities. This was especially marked, as otherwise the body was well nourished. The section of the thorax and abdomen showed only the following: lobar pneumonia (pneumococcus) of the right lung, affecting the upper and middle lobes, with fibrinous pleurisy of the same side; chronic interstitial nephritis; degeneration of the heart muscle; hypertrophy of the left ventricle; slight swelling of the spleen; degeneration and congestion of the liver; and a moderate general arteriosclerosis.

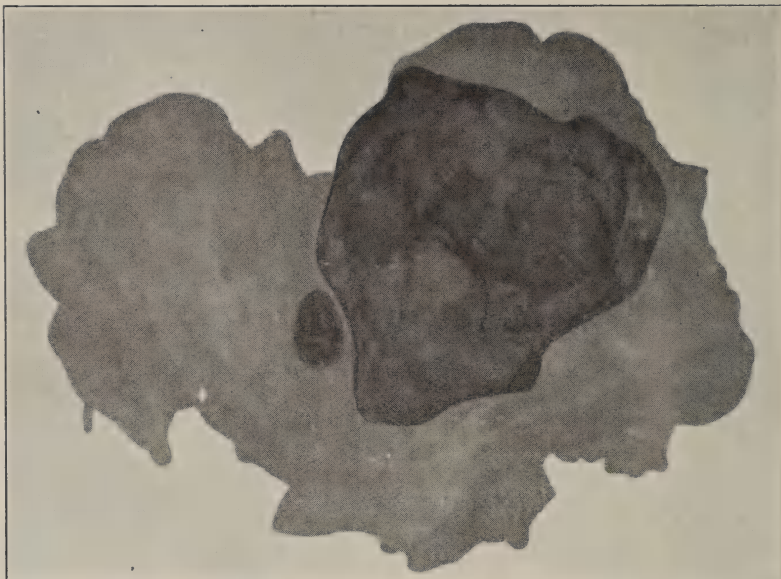


FIG. I. Tumor with surrounding floor of middle end posterior fossæ.
The oval to the right represents the spinal cord.

Section of the Cranium: The skull cap was found to be of average thickness, the dura mater was normal in appearance and disposition. It separated easily from the soft covering. The superior longitudinal sinus contained fluid blood. The meninges were transparent; the convolutions appeared flattened; the sulci in part obliterated. The brain substance was anemic. On attempting to free the brain at the base, a resistance was encountered in the middle fossa. This was found to be due to attachment to a tumor mass that was fixed in the floor of the middle fossa along the basilar process of the occiput and sphenoid. This attachment was along the basilar artery and with little force was freed from the tumor mass. The base of the brain was indented over the region of the left pons, medulla and undersurface of the cerebellar hemisphere. No loss of substance was demonstrable. The meninges were slightly thickened in these parts. The tumor mass as it lay in the middle fossa, measured 5 cm. in the antero-

posterior diameter, $3\frac{1}{2}$ cm. laterally, and 3 cm. in thickness. It was attached by a broad base to the aforementioned part of the occiput and sphenoid. It lay somewhat more to the left and compressed the cord to the right, flattening it moderately from side to side and extended into the foramen magnum. It was rounded and had a number of small pea-sized nodules extending from the left lateral edge. It was seen to be connected internally through the floor of the middle fossa to the odontoid and the bodies of the upper cervical vertebræ. In consistency it was firm and gristly, its color was grayish white and glistening, with a somewhat hyalin appearance. In general the appearance suggested that of boiled cartilage; while in the main it was firm, in some places it was softer and gelatinoid. The floor of the cranium was removed in part with the main tumor mass. That portion, however, that was firmly adherent to the upper cervical vertebræ was not removed. Other than the slight flattening of the spinal cord, nothing of note was found on further examination.

The sections were taken from different parts of the tumor after first photographing it in the gross. (Fig. I.) The tumor was bisected mesially and a slice through the spheno-occipital portion of the bone with tumor was decalcified. One small nodule was imbedded whole. The bone sections after decalcification were imbedded in celloidin, others in paraffin. Frozen sections were made for lipoid changes. Hemotoxylin and eosin were found to give the best general picture.

The histology in the main is uniform, consisting of a homogeneous matrix, in which the tumor elements are contained. There is some slight variability in different fields, the cells having no definite orderly arrangement and they also vary considerably in size, shape and content. The nuclei, too, show similar variability in size, shape and position. The one striking feature is the vacuolation and the very large sizes attained. The various stages in transition can be followed very readily. The young cells along the peripheral portions of the tumor are nearly round with a finely granular protoplasm and a deeply staining round nucleus, centrally placed, the latter about the size of a red blood corpuscle. The cell first becomes elongated with the nucleus in the larger bulbous end. The protoplasm now develops changes, vacuoles, sometimes one large globular vacuole, pushing the nucleus and the remaining protoplasm to one side, giving the cell a so-called signet ring appearance, or there is the leather bottle appearance with the nucleus in the neck and the vacuoles in the body of the bottle with only a little unchanged protoplasm. In the transition from these, various composite pictures are obtained. At times the delicately reticulated areas suggest degenerated fatty connective tissue. At other times where the cell processes are thicker and coarser, it suggests the hyalin matrix of cartilage with lacunæ, irregular in size and containing variously sized vacuolated cells. There are distinct areas of degeneration and necrosis in the central portions in which, however, no lipoid elements could be demonstrated by Sudan III or Nilblau-Sulfat or the polariscope. Other areas impressed one with what seemed an attempt to imitate osteoid structure, but calcium deposit was not found in any part of the tumor; on the other hand, where the tumor involved the bone, softening and erosion by pressure could be easily demonstrated, the delicate cancellous structure giving way to nodules of the tumor that were growing along the marrow canal. The growth in bone

also shows a more cellular character with small round cell invasion along the edges, among which definite plasma cells can be recognized. In none of the sections can definite vascular structures be demonstrated, but very thin walled spaces containing red blood corpuscles are found scattered sparsely through some of the sections, a single layer of endothelial cells being the only demonstrable structural element, constituting the wall. In the edges where the delicate capsule covered the growth, definitely outlined vessels are found and in several one and two tumor cells are found in with the red blood corpuscles. There are two situations that show distinctly more active cell proliferation. The first of these is in the edges or peripheral portion of the tumor, and the other in those portions involving the bone. In both these locations it would appear, according to our interpretation, to be the result of better vascularity both along the edges of the tumor and in the cancellous portion of the bone. From the gross and from the histological appearance, as well as from the localization of the tumor,

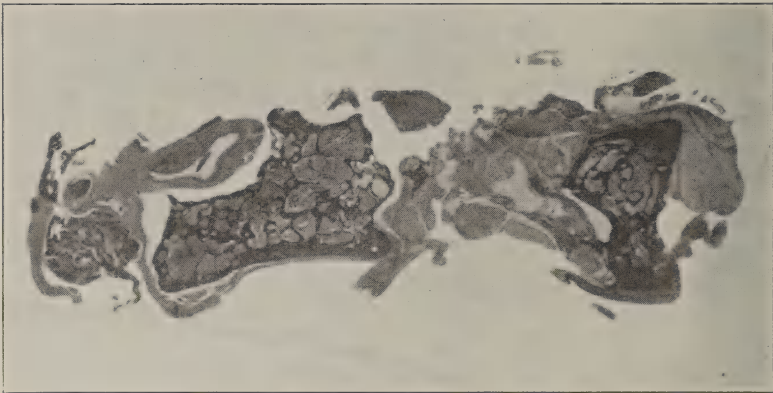


FIG. II. A mesial section to show the invasion of bone. The clinoid processes are to the left end. The section is moderately magnified.

and also from the character of this invasion of the bone, there can be no doubt that the tumor represents a malignant chordoma. Careful search did not reveal any mitoses, but many paired cells were found that suggest an amitotic form of cell division, nor was there any metastasis demonstrable, the growth apparently remaining purely local. The pons, medulla and cervical cord, with adjoining cerebellum, were carefully sectioned and fixed and subjected to the Kulschitzky method of impregnation in order to demonstrate signs of degeneration. Careful study of these sections did not reveal any areas of degeneration so that the neurological phenomena were undoubtedly due to pressure.

LITERATURE

The following is a brief abstract of all the published cases of chordoma which we have been able to find and which have given rise to clinical symptoms. The list includes both those from the spheno-occipital synchondrosis and the sacro-coccygeal region.

Spheno-occipital Region

Case 1. Klebs (7) (1864). A male, middle age, a well-built individual, developed a series of tetanic convulsions in which he died. Autopsy revealed tumor $2 \times 1.5 \times 1.8$ cm. Tumor closed basilar artery; was soft and smooth and originated from clivus; course very short.

Case 2. Klebs (7-b) (1889). This tumor had previously been removed surgically and then recurred. It produced death as the result of pressure on the medulla and the spinal cord. It was about the size of a fig. Apparently sprang from the anterior aspect of the cervical vertebrae.

Case 3. Grahl (8) (1903). Female, aged 51. Had shown symptoms for a period of three years. There was difficulty of swallowing and of speech; there was paralysis of the third, sixth and seventh nerves. She died with symptoms of bulbar paralysis. Autopsy revealed a tumor in the vicinity of the sella attached by a pedicle; it was lobulated and extradural, was soft and jelly-like. It was $9 \times 3.5 \times 3.5$ cm. Examination failed to show any evidence of malignancy.

Case 4. Seiffer (9) (1905). Female, aged 33. Had shown symptoms over a period of four years, beginning with headache, later vomiting and dizziness. She also had a left-sided paresis. Autopsy revealed a tumor the size of a chestnut which grew from the base of the skull near the foramen magnum; there was evidence of pressure on the medulla.

Case 5. Fischer and Steiner (10) (1907). Male, aged 17. Duration of illness only a few months. There was paresis of the left arm and leg, which later went on to complete hemiplegia. There was difficulty of movement of head with pain in neck, also double ankle clonus and double choked disc. Autopsy revealed a large tumor at the base of the skull beneath the dura, which invaded the spinal canal to the second cervical vertebra, pressing on the cord. There was also tumor thrombus in the vein.

Case 6. Linck (11) (1909). Male, middle age. This case was discovered rather late. The diagnosis was made by an exploratory puncture. The cells from this puncture showed many mitotic figures. The mass after death was found to be in the roof of the mouth and in the post pharyngeal wall. There were a number of cranial nerves involved in the mass—left sixth, seventh, tenth and eleventh; also complete loss of taste and smell, left; absence of sensation left half of tongue, pharynx and larynx; left half of tongue atrophied. Reflexes were normal.

Case 7. Frenkel and Bassal (12) (1910). Patient, male, 39. Duration of symptoms one year, consisting of headache, nausea, with poor vision. He died in coma. The tumor was large, measuring

6.5 x 5 x 4.5 cm., which extended from foramen magnum to optic foramina; was associated with much bony destruction at the base of the skull and some of the tumor projected into the nasal cavities.

Case 8. Jelliffe and Larkin (13) (1911-12). Female, aged 36. *This was the first case published in America.* Began with dizziness and occasional attacks of vomiting. There was history of pains in back of head for a period of several years. Later left-sided paresis, which eventually went on to complete hemiplegia. There was also involvement of many cranial nerves, left side—second, third, fourth,



FIG. III. A low magnification of a small nodule.

sixth, seventh and twelfth. Later there was delirium, incontinence, bleeding from nostrils. Death was sudden, with symptoms of collapse. At autopsy the tumor measured 11 x 6 x 7 cm. It was extradural and extended from the olfactory bulbs to the pons and medulla. This pressed upon the olfactory and optic nerves. Third, fourth, fifth, sixth and seventh were imbedded in the mass. Tumor was soft and nodular.

Case 9. Eitel (14) (1911). Male, aged 44. Symptoms had existed one and one-half years. They were those of pressure, including headache and vomiting. Autopsy revealed tumor at base 4.8 x 4.5

x 3 cm. There was flattening of the pons. It originated from clivus and broke through dura.

Case 10. Spiesz (15) (1911). Female, 28. For three months had pain in head with diminished vision. Fields of vision narrowed. Bitemporal hemianopsia. X-ray of skull negative. Was considered a tumor of hypophysis; operation was done through nose. Found cyst, size of a hazel-nut, which on microscopic examination proved to be a chordoma. Symptoms cleared after operation. No further report.

Case 11. Weglin (16) (1911). Female, aged 25. Developed bulbar symptoms from which she died. The autopsy revealed a tumor 5 x 3 cm. attached to the clivus and also producing flattening of the medulla and pons; it was packed tightly in front of foramen magnum, covered by dura; grew around left twelfth nerve; extended forward to tonsil.

Case 12. Haessner (17) (1912). Male, aged 32. Had shown symptoms of dizziness and double vision, headache, vomiting and later optic neuritis. Total duration was four years. Developed severe pains in head and later right sixth nerve palsy. Found dead in bed. Autopsy revealed tumor 5.5 x 6 cm., which partially filled right middle fossa, pressed on right half of brain, deforming it, and surrounded a number of cranial nerves.

Case 13. Kotzareff (18) (1918). Male, aged 51. Began nine months before death with pain in the back, low down, and during last two months had headache, clonic spasms of the hands and arms, associated with pain; eventually delirium, partial disorientation and double optic neuritis. A trephine of the skull was made with negative result. Autopsy revealed tumor extending from the sella turcica to the foramen magnum.

Case 14. Argaud (19) (1918 and 1919). Male, aged 30. Gave signs and symptoms of a tumor of the cerebello-pontine angle. An operation over this area showed a tumor about the size of an almond, located on the middle of the clivus. A histological examination showed it to be carcinomatous type.

Case 15. Daland (20) (1919). Female, aged 30. For three years had hoarseness and headache from time to time; finally a mass appeared in the right posterior cervical region. Associated with this was vomiting, nausea and optic neuritis. A curettage of this mass was done, but some seven months later the mass reappeared. In the interim X-ray treatments had been applied.

Case 16. Fabricius and Moeller (21) (1919). Male, aged 16. Had symptoms extending back for seven years, causing difficulty in breathing and thick speech. Operation through the nose removed part of tumor. He improved; after a few months the mass reappeared. Second operation four and one-half years later; tumor

4 x 2 cm. removed. At the time of the report no recurrence had taken place; this was five years later.

Case 17. Swars (22) (1921). There were symptoms of intracranial pressure. Patient later died. Autopsy revealed tumor having origin from the clivus, which proved to be a malignant chordoma.

Case 18. Hellerman (23) (1921). Male, 30. For two years, difficulty with nose plugging. Later difficulty in hearing and double vision, with involvement of soft palate. There was sixth nerve weak-

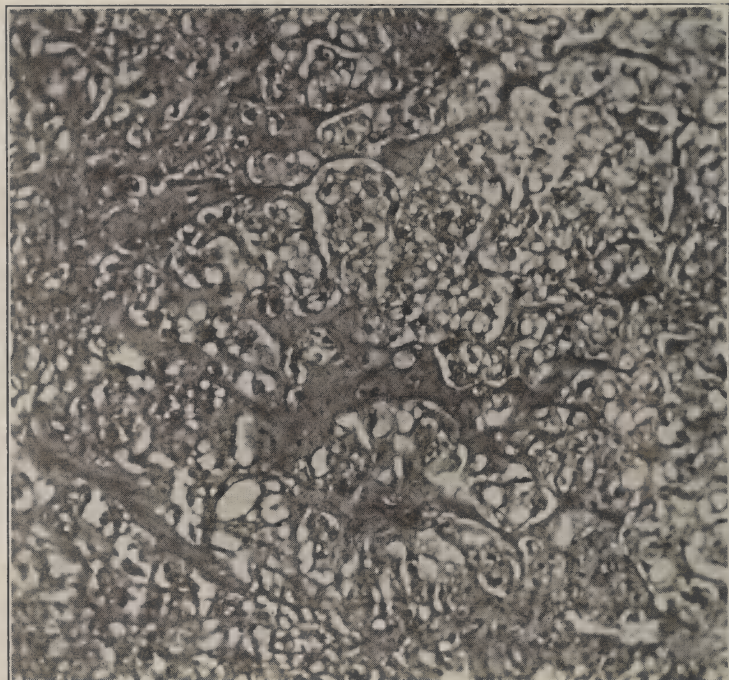


FIG. IV. A field from the center of the nodule, Fig. 111. 600 \times .

ness. Tumor was removed by nose operation. Histological examination showed it a chordoma. There were no symptoms of recurrence some months after operation.

Case 19. Lemke (24) (1922). Female, aged 45. Brought to hospital unconscious and died within a few hours. Tumor 5 x 3.4 cm. at base of the skull at junction of sphenoid and occipital bones. It was a malignant chordoma.

Case 20. Burrow and Stewart (25) (1923). Male, aged 30. Headache for three years with vomiting and unsteady gait; poor vision; weakness of limbs, especially of right arm; some atrophy of the left optic nerve, with early changes of right. There was some

paresis of the third, fourth and sixth left cranial nerves. He had a stiff neck and double Babinski. Death was produced by respiratory failure. The tumor arose from clivus, compressing the optic tracts, pons and crus. It was 6.5 x 5.5 x 3.5 cm. It proved to be a malignant chordoma.

Sacro-coccygeal Region

Case 1. Feldman (26) (1910). Female, aged 46. Symptoms extended over a period of one year. Large tumor arose from the anterior surface of the sacrum and lay behind the rectum. Tumor was removed. Apparently unattached to bone. No signs of recurrence three months after operation.

Case 2. Mazzia (27) (1912). This patient was a male, aged 44. Had a tumor existing for twenty years. It was several times excised. The first time the tumor was several inches in diameter; it recurred within nineteen months and this time the sacrum was removed with it. A third recurrence followed in two years, this time no operation being made, it being considered inoperable.

Case 3. Debernardi (28) (1913). Male, aged 56. Tumor existed for two months. It was firmly attached to the sacrum and later ulcerated into the rectum. It apparently was composed of two types of tissue; one a retro-coccygeal part, which was of a sacromatous combination with mitotic figures, also chordoma cells; and an intrapelvic part which had the typical chordoma formation. The tumor was removed by operation but no after history is published.

Case 4. Wood (29) (1913). Female, aged 35. Tumor of post-sacral region. It had existed four years. Was removed. It returned after another four years in the right buttock, when it was again removed. No further history recorded.

Case 5. Albert (30) (1915). Male, 28. Gave history of severe pains in the region of the coccyx, with difficulty in defecation. This had existed one and one-half years. The mass apparently protruded from the posterior wall of the rectum and it was not attached to the vertebral column. It was removed but returned in four months. Second operation with no improvement and patient died within fourteen months.

Case 6. Tuffier, Gary and Vignes (31) (1914 and 1919). Female, aged 55. Symptoms over a period of three years; fair-sized tumor between rectum and coccyx was removed with coccyx. Returned within three years; after return, tumor adherent to rectum and invaded muscles. It was a carcinomatous type.

Case 7. Wagner (32) (1915). Male, 56. Small tumor of sacrum. This was removed and found to be typical malignant chordoma. Treated by X-ray and improved. No further history.

Case 8. Lund (33) (1919). Female, aged 60. Symptoms dated back three years. Two years pain in sacrum, disturbance of sphincters. Small tumor, not adherent to rectum and on the anterior surface of sacrum, removed. Apparently growth not all removed; recurrence set in and patient died fourteen months later.

Case 9. Pototschnig (34) (1919). Male, aged 40. Tumor weighing thirteen pounds, with a duration of ten years, in the sacral region. Death two days after operation. Post-mortem showed metastases in the liver and inguinal lymph glands.

Case 10. Peters (35) (1919). Male, aged 68. Five years previous small tumor of spine, which grew rapidly; later reappeared

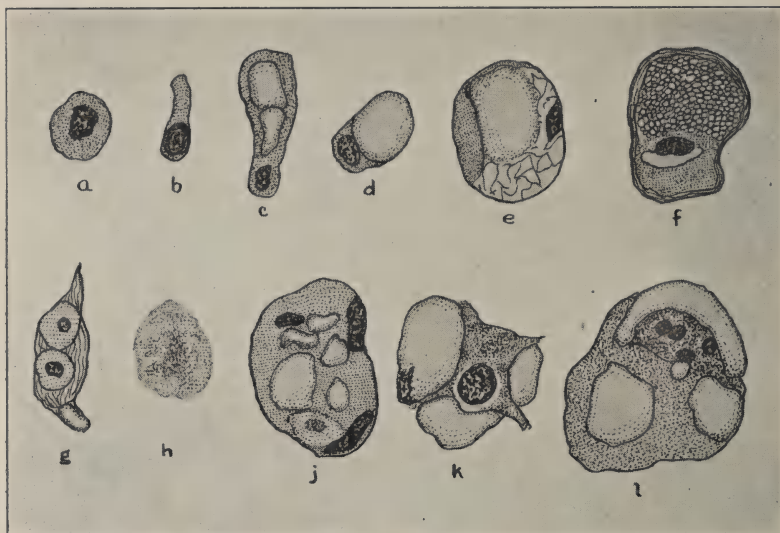


FIG. V. Various Cell Types. a, b, c, d, g, represent young cells. h, a degenerated young cell. e, f, j, k, l, large multivacuolated and composite forms.

and was operated upon. Adherent to tip of sacrum. Returned after one year, when metastases were noted.

Case 11. Lewis (36) (1921). Male, aged 54. Insane from age of 23; lumbar pain for six years; four months before death, abdominal pain; a large nodular mass was removed from neck of bladder. Died three months later. Postmortem showed tumor filling pelvis and attached to tip of coccyx. Chordoma in nature.

Lewis, Case 2. Male, aged 30. Admitted to hospital with history of marked constipation. No bowel movements for five days. Sixth day vomited; was distended. At operation found large tumor in pelvis with nodules through peritoneum. Death in seven months. Post-mortem revealed typical chordoma about the rectum, with metastasis.

Lewis, *Case 3*. Male, aged 58. Complained of frequent urination and pains about the rectum for two years; later pains down right leg; mass about lower coccyx. A tumor 6 x 5 cm. removed, which was chordoma. No further history.

Lewis, *Case 4*. Female, aged 23. Complained of constant pain about rectum. Two years before small rectal tumor removed; later recurrence and could feel large mass per rectum. Metastasis occurred. No further history.

Case 12. Micotti (37) (1922). Male, 53. Symptoms began following trauma of sacrum three months before and the mass grew rapidly up to removal; later recurred. Metastasis set in. Patient died.

Case 13. Stewart (38) (1922). Male, aged 65. Duration of symptoms nineteen years; after the eighth year a tumor over coccyx was removed and then five years later a mass appeared in left buttock; three years later appeared over the right scapula. He died eleven years after operation.

Case 14. Linck and Warstat (39) (1922). Male, aged 61. Bony fistula of feet as child; legs weak since; last three years worse; loss of sphincter control; poor gait and back stiff. No tumor could be felt by rectal examination; operation, however, showed tumor in lower dorsal region, which involved the spine and the cord; metastases were present.

Case 15. Hirsch and Ingalls (40) (1923). Tumor mass projecting from the sacrum backward; operation under local anesthesia, and after three years had not returned.

Other Locations

Case 1. Alézaiss and Peyron (41) (1914). Female, aged 68. A tumor projecting from the left superior occipital region, producing pain in the shoulders and in the neck. It was about the size of an orange and had existed eight months. It was removed. It was attached to the inside of the skull through a small aperture. No returns after operation.

Case 2. Koritski (42) (1914). This patient presented a number of knob-like masses in the upper and lower jaws the size of nuts, which were pedunculated and were covered by mucosa. There is no after history known.

SUMMARY AND COMMENT

The case of a male, forty-nine, who showed symptoms extending back over a period of two and one-half years, beginning with headache, dizziness and pain in the neck. Later there was general weakness. After one and one-half years numbness of hands and forearms and later of feet was complained of, and during the last

few months this spread over the trunk. Associated with the numbness was muscular weakness, which progressed, and during the last few months he was unable to move any of the extremities. He had to be fed and catheterized for two months. There were increasing bulbar symptoms later. Death from pneumonia.

Autopsy revealed a tumor 5 x 3.5 x 3 cm. at base of skull having origin from the sphenoccipital region and extending backward into foramen magnum. Histologically it showed the typical structure and cells characteristic of a chordoma.

Our case is the twenty-first reported as showing clinical symptoms and having origin from the sphenoccipital region and it is the third in the American literature. The case showed evidence of malignancy and there was considerable bony destruction at base of skull and upper cervical vertebrae. The tumor had the usual characteristics of the reported chordomata in that it was smooth, firm and lobulated on section. It compressed the left pons, medulla, cerebellum and occipital lobe of the brain and also the left upper cervical cord, and also several of the cranial nerves. No degeneration of the bulb or upper cord could be found in careful examination of sections made from those areas. In this respect it resembled other recorded cases.

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SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

THE FOUR HUNDRED AND EIGHTEENTH REGULAR MEETING, FEBRUARY 3, 1925, E. G. ZABRISKIE, M.D., RETIRING PRESIDENT, IN THE CHAIR

A CASE OF INDUCED EPILEPSY

B. ROSENBLUTH, M.D.

This case is presented with the view of bringing out an interesting point in the study of epilepsy. The patient is a man aged fifty-four whose illness dates back fourteen years. At that time, he had been in Beth Israel Hospital with a diagnosis of cerebral thrombosis. The case was characterized by a slowly developed left hemiparesis with some slight deficiency in speech and writing. Besides, there was a diminution of pain, touch and temperature sense over the major portion of the same half of the body. There was no temperature. The blood counts were normal. The urine was normal. The Wassermann of the blood and cerebrospinal fluid were negative. The duration of his illness at that time was over ten weeks.

Dr. Rosenbluth saw him eight years after his first attack when he had a recurrence of his weakness on the same side. Besides his weakness, the man had a positive Romberg in which he was thrown backwards or sidewise. There were no sensory disturbances and no aphasic phenomena. The most interesting feature that he presented was what happened when he attempted any volitional act with the arm or leg or eyelids. After the first effort, the arm or leg would be thrown into a convulsive attack of a chronic nature limited to the limbs that were in action. This same thing occurred when a periosteal or tendon reflex was taken on the left side. When this occurred, the face became slightly flushed and the man's manner became confused.

In January, 1925, he was examined for this presentation. He had headaches and dizziness with psychic insomnia. He has not been able to work for two years on account of a minor accident to his affected shoulder. He always was left handed. Mentally the man is alert, speaks well; station and gait normal with eyes open. Positive Romberg. Pupils react normally. When he closes his eyes, he cannot open them as this movement induces a clonus of the eyelids. The clonus of the limbs and head are the same as they were seven years previous. Though he does not use his eyes for guidance in walking, he cannot lift his foot from the floor when asked to walk with his eyes closed though helped along. He has no adiadochokinesis. This test always brought out a clonus of the left hand and

arm after rotation had gone on for a while. Reflexes are all active, especially on the left side. The clonus looks like the intention tremor seen in Huntington's chorea. Sensation is normal. Vibratory sense normal. Visual fields normal. The plantar reflex at times gives a Babinski movement on the affected side. The Chaddock does not give this. His blood pressure varies from 212/116 to 180/126. Urine negative.

Dr. Rosenbluth considers the clonic movement as an automatic afterflow from the lenticular nuclei which had been started off by volition from the cortex or by stimulation by the taking of the reflex. On account of the defective connections between the affected cortex and these nuclear masses the usual inhibitory impulses are deficient. Hence these primitive automatic centers in which are patterned the usual habituated functions of the cerebrum keep going after they have been started, like the projected runner whose pace continues, despite volition to the contrary, after crossing the tape.

The phenomena were demonstrated in the patient before the Society.

Discussion

Dr. M. Neustaedter: What are the fundi changes?

Dr. Rosenbluth: There are none.

Dr. Leon T. Cornwall: Does he experience any subjective phenomena in association with these seizures? Is there any feeling of discomfort?

Dr. Rosenbluth: No.

Dr. C. B. Craig: Does he have any spontaneous attacks?

Dr. Rosenbluth: No; they only come on when the reflexes are taken or he is set in motion.

Dr. Neustaedter: Does he complain of pain on that side?

Dr. Rosenbluth: No.

Dr. Craig: Do the attacks ever spread from one extremity to include the entire side?

Dr. Rosenbluth: No.

My own impression of this phenomenon is that it is very likely a dissociation between the cerebral cortex and the striated body due to arteriosclerosis and naturally if we start off the motion, it goes on, the same as a runner who is going fast cannot stop when he crosses the tape; it is that type of motion which continues despite the fact that the initiation for it has stopped.

A CASE OF NEUROBLASTOMA. PRESENTATION OF PATHOLOGICAL SPECIMENS AND LANTERN VIEWS

MAX LEDERER, M.D. (*By Invitation*)

The patient from whom these specimens were obtained was a female, three and one-half years old, admitted to the Jewish Hospital of Brooklyn on October 4, 1924.

The chief complaint was shortness of breath and cough for a year and a half, with a bulging of the left eye which had been noticed for two months. The past history stated that the child had

been suffering from continuous colds since birth, and that in the past year and a half the mother had noticed that the child was short of breath, and that there was edema of both extremities. The family physician told us later that he had discovered a cardiac lesion, an enlarged heart, with a double murmur at the base, and he had interpreted this as a syphilitic lesion of the heart, because there was a definite history of syphilis in the grandparents and in the parents. He had treated the child with mercury and iodides, and he thought there had been some improvement under such treatment.

On admission, there was a bulging of the left side of the face with a left exophthalmos. The heart condition was noticed at that time, with what seemed to be evidence of pericarditis. A mass was felt in the left hypochondrium which was thought to be spleen. The child was in the hospital for two months, and was thoroughly studied. The only positive signs were the cardiac condition, the left exophthalmos, and the mass which was thought to be enlarged spleen on the left side. All clinical and pathological examinations were negative. Repeated Wassermann tests were negative. The cerebrospinal fluid examinations showed nothing. Blood counts showed progressive anemia, rather rapid, and the blood chemistry and urine examinations were negative. X-ray examinations disclosed at first a rather indefinite kidney shadow on the left side. The kidney was not clearly defined, although the right was plainly visible. In the right femur there was an area of bone rarefaction and of bone production which was interpreted as being due to an osteosarcoma. Later on there were noticed in the calvarium areas of rarefaction, and areas of rarefaction about the left orbit. We thought we were dealing with a case of osteosarcoma originating in the right femur which had metastasized to the skull. The child became progressively worse, and on the 31st of October developed a definite left sided facial paralysis. The hearing was not tested, so we did not know whether it was impaired. The child died two months after admission to the hospital. The blood pressure during the time in the hospital ranged from 105 systolic and 75 diastolic to 110 and 70, which is a little high for a child of that age.

On autopsy we found a very large heart and an area of scarring in the left ventricle near the apex, about the size of a silver dollar. This was covered with a tab of fibrous tissue which caused an adhesion to the parietal pericardium. The left ventricle was tremendously dilated and somewhat hypertrophied. We were at a loss to interpret this finding. We did not know whether it was due to syphilis which may have existed, or to some embolic condition, perhaps coexistent with one of the repeated infections of which the child gave a history. In the left hypochondrium we found a mass above the left kidney causing pressure atrophy of the upper pole. It was lobulated, with greyish white tissue, some red and some definitely yellow. There were no enlarged lymph nodes in the retroperitoneum. The growth did not involve the kidney itself. It did not involve the diaphragm. There were no regional metastases either by the lymphatics or by contiguity. When one looks at the

anterior surface, the cortex of the adrenal is plainly seen. The chest was absolutely free of any malignancy. In the head we found that the calvarium was riddled with metastases from the frontal portion back to the occipital. The dura was also infiltrated, there being a number of metastases along the superior longitudinal sinus and a thrombosis of the longitudinal sinus itself. The thrombus is not malignant. It is a blood platelet and fibrin thrombus. There was a large metastasis over the left occipital lobe, causing a depression in the occipital lobe and some loss of substance and perforation of that lobe, but not into the posterior horn of the ventricle. There were metastases in the dura covering the petrous portion of the left temporal bone, surrounding both seventh and eighth nerves, and there was a large metastasis in the orbit itself, spreading and pushing the eye forward, accounting for the exophthalmos.

This case belongs to that group of neuroblastoma described by Hutchinson. It is strange that the left side tumors of the adrenal metastasize on the left side, causing exophthalmos and cranial metastases, and those on the right side usually do not metastasize to the cranium. These neuroblastomata metastasize only by virtue of the undifferentiated nerve cells. They do not metastasize by virtue of the ganglion cells. Ganglion cells are never found in the metastases. For that reason the metastases can be confused with a sarcoma, and the diagnosis be erroneously made. No rosettes were found in this growth. We have here a case of neuroblastoma quite classical (except for the absence of rosettes), which can be diagnosed clinically, but is occasionally erroneously diagnosed, particularly if attention is focussed on the eye only, and if sections are removed from a retro-orbital tumor the diagnosis may be missed.

A word about the therapy of this case may be of interest. The child was subjected to intensive anti-syphilitic treatment without the slightest effect. Deep X-ray radiation was attempted, and the consensus of opinion of all who attended the child was that the exophthalmos diminished somewhat in size and the swelling of the face diminished somewhat, but of course such treatment was ineffectual.

Discussion. Dr. J. H. Globus: This case is another extremely interesting instance added to a fairly large group of neuroblastomata, which have been described since the first publications of Marchant, Wright and Martius. They have opened this important chapter on the pathology of tumors of the sympathetic nervous system which is not only interesting to the pathologist, but is of great service to neurologists. Many authors have followed them, particularly Landau, Wohl, R. A. Lambert, and others, who have studied the question of neuroblastoma and helped to solve the problem. They have rescued this particular form of tumor from the melting pot of sarcomata, and have also established the fact that not all so-called neuroblastomata are neuroblastomata, that is to say, there are various stages or forms of tumors grouped under that name though they represent different stages in the development of the neuroblast. In my opinion, the tumor shown here to-night is not really a neuroblastoma in the true sense of the word. I believe there are to be seen in this tumor

large cells apparently sympathoblasts, showing already fairly high differentiation, which mark it as a sympathoblastoma, and as we were told to-night that the metastasis in this case was limited, involving only the bony structures, it would seem that the tumor did not behave fully as a malignant neuroblastoma. I think I have seen some "rosettes" in some of the sections shown here to-night. What we are dealing with here is, in my opinion, a tumor belonging to the general group of neuroblastomata, but where the cells have reached a higher stage of differentiation and belong to the stage of the sympathoblast. Its lack of widespread metastases, its lesser degree of malignancy, and its cellular make-up would mark it as a sympathoblastoma.

Dr. Lederer: I am grateful to Dr. Globus for the view that he has expressed. The case was of much interest to us, and one of the reasons why I named it neuroblastoma was because Harbitz advised that these be called neuroblastoma without going into any shadings. The difference whether it is a neuroblastoma or a sympathoblastoma is after all academic. What I attempted to do was merely to impress this condition more clearly on the clinician than on the pathologist, because so far as I have been able to learn, a great many of these cases are overlooked. The pathology of the abdomen is lost sight of in the pathology that surrounds the eye.

TREATMENT OF PERIPHERAL NERVE PARALYSIS WITH DIATHERMIA

DR. A. LUX (*By Invitation*)

At the present stage of our knowledge of electricity we are convinced that it has no curative influence upon a paralyzed nerve, as is commonly believed. Nevertheless, we feel that constant current will increase the irritability of muscle and nerve, and according to a recent theory interrupted current will prevent the atrophy of the nerve. The author has accidentally observed the influence of diathermia upon a paralyzed nerve and has through careful study postulated the various methods in applying this type of current on different parts of the body, wherever needed. Over a hundred cases of peripheral nerve paralysis were treated by this method. The case of a young man, twenty-six years of age, is demonstrated here as one of the most striking results obtained. This patient was referred to Montefiore Hospital with the following history:

Sixteen years ago in a mastoid operation, the facial nerve was injured which resulted in a complete peripheral facial paralysis of the left side. Electricity in all its forms was tried in various institutions without result, and when the patient was examined at the Montefiore Hospital the following was the status: Face is drawn to the left side, no nasolabial folds visible on paralyzed side. By attempt to whistle or to show teeth, the typical picture of facial paralysis is seen. Patient cannot close lid at all, and the cornea shows signs of superficial inflammation due to exposure. Sensory of skin normal. Patient states that his face has been the same for

the last sixteen years. There was partial reaction of degeneration of the left facial nerve.

Diathermia was applied according to the usual routine. After five treatments the patient reported that he felt as though the face were more pliable. After ten treatments the patient made the first attempt to close his eye spontaneously. Status made after twenty-four treatments shows that the face appears equal on both sides; the nasolabial fold is distinct on both sides; attempt to whistle, showing teeth, shows no abnormality. The patient closes eyelid spontaneously. The electric reaction of facial nerve reveals no difference as compared to the other side of the face.

The explanation for this unusual case is probably that there was a scar left on the nerve due to the injury and by concentrating the entire diathermia current on this part, the scar tissue has been absorbed. In our belief, hyperemia caused by the diathermia current is the effective agent. This hyperemia is different from hyperemias originated by all other methods, because:

1. The current of diathermia penetrates into the deep seated organ and produces heat in the organ itself subject to the treatment.

2. The warmth produced by diathermia is originated by a free energy which is introduced into the body by means of electricity. The warmth produced by all other methods is heat obtained from the organism itself.

3. Diathermia brings, by reasons as above stated, a surplus of energy into the diseased tissues, while all other methods cause an increased use of the body's own energy.

Discussion. Dr. G. H. Hyslop: I would like to ask if Dr. Lux has tried using this form of electricity with patients with organic disease of the spinal cord in the acute stages. On our ward at Bellevue this fall we had a young boy with multiple sclerosis who had a relapse, and in this relapse developed complete paraplegia with sensory loss which enabled us to state that he had a large patch in the lower cervical region. After this state of complete paraplegia had been in existence for ten days to two weeks, I had him placed on localized diathermia focussed on the level of this presumed patch. It was in the third treatment that the patient observed to the physiotherapy aide that he thought somebody had taken the stockings off his feet, and two weeks following that reaction, the boy was able to stand. The patient was an intelligent boy, and stated that during the application of diathermia he had subjective sensations, paresthesias, at times, as well as an awareness of portions of the body which to examination still were anesthetic. That experience led us to try the same form of treatment in certain other instances. We do not know yet what it means. We have not had enough material to be able to tell what sort of response one can expect comparable to what you observe in peripheral nerve lesions.

Dr. Smith Ely Jelliffe: Have you had any experience with anterior horn involvements (poliomyelitides), and also with syringomyelias? We know that for many years Lhermitte and a number

of French observers have been using various types of electrical stimuli over syringomyelitic areas.

Dr. Globus: I have two academic questions to ask. The first is: What ground do you have to suppose and how can you prove that absorption of scar tissue takes place under this method of treatment? Have you had means of observing it in this case? How do you know there was a scar over the nerve and that such scar was absorbed by the aid of your treatment? The second question is: How do you know that the application of diathermia from the outside increases metabolism of tissues? How do you know that no metabolic change takes place where diathermia is applied?

Dr. C. B. Craig: Have you tried this treatment with cases of trifacial neuralgia? If so, with what result?

Dr. M. Neustaedter: I would like to know if you have tried this treatment with peripheral palsies with complete reaction of degeneration, and if so, what result has been obtained.

Dr. Lux: The observations at Bellevue Hospital are interesting. I am treating at the present time a great number of those types of cases. In the very beginning of the treatment we will get astonishing results. I have made that observation in ten patients, and particularly if I apply the heat not on the local spot where you see the lesion has taken place, but apply general diathermia. Patients who cannot walk will start to walk, but then they fail. This is most likely the influence of the general hyperemia set forth by the diathermia which makes these changes. I have not been able to observe distinct changes. I am now working on ten cases at the Montefiore Hospital. The results are only encouraging in the beginning, and I have not been able to obtain definite results.

In reply to Dr. Jelliffe's question concerning syringomyelia cases, treatment is very greatly hampered in that type of case by the fact that the people do not perceive the heat. I began treating a couple of cases, but could go no further with them. I am trying to treat cases now with a current which cannot cause burns, but that naturally takes months before we can get results.

In reply to Dr. Craig's question, trifacial neuralgias have been treated by other people as well as myself. Dr. Wolf at Mount Sinai Hospital has treated some of Dr. Abrahamson's patients. Our method is to treat the patient through the eyes. They have seldom gotten results by treating the nerve itself, but we have had very encouraging results with the other method, even in cases where no other form of treatment has benefited the patient at all.

In answer to Dr. Globus, I pointed out in my paper that there was possibly scar tissue in the facial nerve, and probably he is right, there was no scar tissue, but then there was a lesion in the nerve. We have propagated regeneration of the nerve. The absorption of scar tissue can be very easily proved from experiments in animals. I have pictures which I made in Paris showing animals with scar tissue in the peripheral nerves, and how it was absorbed.

In regard to the next question about the heat and metabolism in diathermia; the patient has a sensation of heat in the skin. By

applying diathermia the patient feels heat inside, and the skin warms up later. If you apply 300 volts the patient will feel heat inside, and if you stop the current, you see no effect on the skin whatsoever. Diathermia heats up the particular part on the principle of resistance, just as an electric iron will heat up the body. It propagates hyperemia of the skin, and encourages the superficial tissues for a chemical interchange. I pointed out the chemical interchange in my paper, and I mentioned metabolism as a side track which has not been proved, but the chemical interchange has been proved by numerous experiments.

ADDRESS OF THE PRESIDENT ELECT OF THE SOCIETY ON MOBILITY

I. ABRAHAMSON, M.D.

I have no words in which to make acknowledgment of the great honor you have done me.

For many years neurology has been winning its way upwards in the hierarchy of medical sciences, until now its position is assured, and all pay tribute to it as the science of the executive and administrative and legislative departments of the confederacy of functions that constitute human life. Particular aspects of our constitutional habit interest each of us, and excite us according to our nature and our opportunities to investigate them. Dr. Jelliffe will elucidate for you the impulse that determines your choice of interest, and he will also warn you of the penalties that will confront and complex you, if that impulse should be denied expression. I should like to add to his weighty warnings my most earnest request that you give free vent to that expression here. The psychic health of this Society depends upon that free expression, in written or in spoken speech. The Society expects and will appreciate a communication from every one of its Fellows, and in favoring us with their communications, the Fellows will find that their complexes will cease from troubling, and their motor equivalents will find rest.

My nature and opportunities have been such that I have found myself intrigued mainly by motor equivalents. I happened to be placed near the center of the epidemics of lethargic encephalitis in this country, and was in consequence led to study the motor manifestations of this disease as I saw them, and to report the results to you. This, in turn, caused me to be curious about the motor mechanism, and at various times I have submitted for your valued criticism, deductions and inferences as to the nature of muscular action, which clinical study of this epidemic disease seemed to justify. To-night, I should like briefly to summarize what we think we know of some common motor actions and their causes in the hope that certain among you may be led to concern yourselves to check up the work already done, to correct it where it is at fault, and by your observations to carry it forward from the point of abstract interest where it now halts, to the point where it may become available for relieving the suffering it causes those in whom we have the occasion to study it.

The function of mobility of the body and of its several parts is carried out by an organ which we call the musculature, and which is composed of an infinite number of muscular units, grouped to initiate, to reinforce, to maintain, to balance, to stop, or to reverse such changes in our skeletal attitude, as we consciously desire, or emotionally suffer. A vast and complex nervous mechanism controls the musculature, and produces in it the phasic changes which tend to voluntary movement. These changes are caused by chemical action in the muscle cells, that give rise to increase or lowering of what we call muscle tone. As evidence of the chemical changes, we have reports of careful workers on the metabolism of active and of resting muscles. Such chemical changes are accompanied by electrical changes of measurable direction and extent. And also by other physical changes, among which we for the moment are chiefly concerned with the elastic state of contraction, or tone of the examined muscles.

If we consider the arm hanging quietly by the side, we may without serious fault regard the tone of the flexors of the elbow in that position to be on a par with the tone of the extensors. The arm hangs quietly, the flexors do not dominate over the tone of their antagonists, the extensors, and no movement results. If the flexor tone does dominate, the arm bends upwards. The flexors shorten, the extensors stretch, and as the movement progresses, through a series of intermediate postures to the desired posture, to every new posture there pertains a definite enhancement of muscle tone in the flexors and a definite diminution of muscle tone in the extensors.

Throughout the movement, this enhancement of tone in the flexors takes place at a definite rate. And each serial posture must be maintained until that of its successor in the movement can be superimposed, to produce the smooth, thrifty character that denotes normal movement.

Normally the tone changes follow one another at a rate of about 20 per second, and each change at that rate is ample in extent and in duration to fulfill its desired end. We have not yet attained much exactness in determining the amplitude of the individual changes. The amount of the successive changes of tone may vary rhythmically or arrhythmically.

The duration of the individual changes may vary too, and so may the rate at which they follow one another, either with or without variation in the extent or duration of the individual changes. We have therefore at least three variables to consider in the changes of tone in the flexor muscles, namely, the extent of intensity of each change of tone, its *duration*, and the *rate* at which the changes occur.

And these three variables which we distinguish in the enhancement of the tone of the flexors we can likewise distinguish in the synchronous diminution of tone in the extensors. And when we are confronted with a defect in voluntary movement we try to determine by analysis of the defect, just where the fault lies among these variables.

Boers attributes the tremor of old age mainly to hypotonia, to

the inadequacy of the intensity of the successive changes in tone, the inadequacy both of the enhancement of the tone of the agonists, and the inadequacy also of the diminution of tone in the antagonists. It seems unlikely that other things being equal, such inadequacy would create much disorder in movement. Rather should it show itself in delay and limitation and weakness of the movement. Von Monakow regards the tremor of Parkinson's disease as partly due to hypotonia, but partly also to a falling off in the rate of succession of the changes in tone. He observed that the rate in Parkinson's disease fell from 20 to 16 per second, and inferred that between the changes the muscles had time to relax in part, which gave the movement an uncertain and oscillatory character. If the hypotonia and the falling off in the rate of change be equal in both the agonists and in the antagonists, it would seem, *a priori*, as if the movement would be less disorderly than if these faults affected one group to a greater degree than the other. And the greatest likelihood of disturbance seems to lie not in lack of intensity, or even in diminution of frequency, but in lack of correspondence between the duration of the enhancement of tone in the agonists and of the reduction of tone in the antagonists.

Our studies so far have been mainly concerned with the tone enhancement changes. We do not as yet know much about the complementary reduction of tone in the antagonists. But if, as I am inclined to think, the enhancement of tone in a muscle is normally in part a liberation of energy due to the cessation of prevailing inhibitory reflex nervous action, and diminution of tone in the antagonists is due to an increased activity of such inhibitory action, we shall find the key to many of these problems of disorderly movement not in a study of the more or less passively contracting agonist, but in the study of the active inhibition of tone that is simultaneously induced in the antagonists.

The prevailing tone of muscles, the tone, so to speak, of each particular muscle locality, is maintained in part at least by the sarcoplasmatic portion of voluntary muscle. The sarcoplasmatic portion of voluntary muscle is distinguished from the fibrillar portion by histologic structure, chemical composition, electrical reaction, function, and nerve supply. The nerve supply is derived from neurons which originate in cells in the lateral horn of the spinal cord and their analogues in the cerebral end of the nerve axis. It is noteworthy that adrenalin which produces fine tremors in normal individuals, and emotion, exertion, or excitement, which stimulate adrenalin secretion and also induce tremulousness, all aggravate the tremor of Parkinson's disease, a positive result which may be attributable to stimulation of the active inhibition of tone in the antagonist groups, whose nerve supply is closely related to the sympathetic system of nerves that adrenalin excites.

Upon these prevailing local tone changes which I am suggesting, are established at this neurochemical level, the voluntary phasic changes of the musculature as a whole which are superimposed, and correlated by reflex nervous action, of such complexity that I

think I may easier make the matter clear, if I now turn from the elastic state of the contracting voluntary muscles to the mechanism by which the influence of the will is brought to bear on them.

The desire that evokes a movement calls forth as one of its essential attributes a series of postural images, linking the desired with the existing posture. Each postural image has a certain intensity with which it demands motor expression and which leads it to dominate over the existing postural images so that it effectively prevails. These postural images leave the conceptual sphere, and pass in regular order, with a given urgency into a prepyramidal region of basal nuclei and associated structures where they lose their conceptual character, and become converted into nerve impulses which ultimately pass to the cells of the Rolandic areas. In their passage these impulses are finally analyzed and distributed along specific neurons according to the ultimate destination of the impulses they carry. In other words, even in the prepyramidal region, there is definite functional localization. And when irritative lesions affect these prepyramidal neurons we see the spontaneous muscle twitchings of myoclonus, or in degenerative lesions, dystonia.

The intensity, rate, and frequency of the postural images that excite the prepyramidal structures, we have no means of estimating. But the movements which express each of these successive postural images, receive in this region their tone qualities. It is here the movement acquires its readiness, its strength, its rhythm, and its integration with the existing state of the musculature. And here again the enhancement of tone is normally in part a liberation of energy due to the cessation of the generally prevailing inhibition of reflex and automatic and emotional nervous action, and the complementary diminution of tone in the muscles that oppose the muscular expression is due to an increased action of the prevailing inhibitory influences.

From the prepyramidal region the impulses pass in ordered sequence to the cells of the Rolandic area whence at regular intervals they are discharged through the pyramidal tract to the anterior horn cell, and thence by the lower motor neuron to the voluntary muscle.

In the conceptual sphere, variations in the intensity, rate and frequency of the excited postural images, can produce chaos in movement, but every movement expresses a purposeful posture and not an isolated muscular act. It is chiefly in this sphere that the choreiform movements originate.

Every willed movement has a definite aim; it fulfills to the satisfaction of the critique the desire which evoked the movement. That desire called forth as one of its essential attributes, a series of central after images of the postures linking the desired with the existing posture. And every component posture of the willed movement, as the movement was performed, excited a peripheral after image of the moving part. Those postural images that were initiated by the desire, and those that were excited peripherally by its performance, neutralize one another perfectly, satisfy the critique, and

the desired aim being achieved, the musculature comes to rest or proceeds to express desires anew.

In chorea the naturalization does not occur; the central motor images remain undischarged and capable of exciting further muscular movement. The peripheral after image of the choreiform movement has also the power to excite change, as it induces a desire to correct its motor consequences. Further movements ensue, and each posture achieved contributes further to disturb the postural associations till they become a whirl of futility and confusion. So fatigue comes, and adds to the postural instability. And the reproduced postures succeed one another in increasingly chaotic sequence and with uncalled for violence. The movements no longer express conscious desire, but are expressive merely of the dominant postural images, that emerge from the emotional, volitional, and peripheral excitations that are rioting through the sphere of the postural associations, exciting one muscular posture after another. And as these are not harmonized with their predecessors, but merely supplant them, they lack tone, for they possess only the surplus tone of their dominance.

A still greater tone lack is observable in the usual affections of the prepyramidal system, but here we see defects arise in the several qualities of tone, affections of the readiness, strength, rhythm, and duration of the movement. There may be the myoclonus or dystonia we have already mentioned, but these I think occur as the result of affections near the end of the prepyramidal system, where it is converging upon the Rolandic area. Usually we see a more diffuse increase or lack of muscle tone; there may be a mild paresis; or delayed initiation and retarded execution of movement; or diminished volume and extent of the movement, or easy fatigability; or loss of physiologically associated movements; or lack of affective movement; and these changes result in alterations in station and in gait, disturbances in the higher automatic coördinations, such as walking, chewing, swallowing, and speaking adiadochokinesis; and propulsive movements.

When we come to the lesions of the pyramidal tract itself, we find the phasic variation of tone more or less abolished, together with all the attributes of plasticity that cerebral inhibition of tone confers. There is loss of movement, increased resistance to passive movements, rigidity with clonuses and exaggerated deep reflexes, with the return of the primitive skin reflexes, such as the Babinski. If some movement survives, the pull of the antagonist sets in earlier and persists longer, so that its recoil effect is premature and excessive.

The rigid muscles assume fixed attitudes which reflect mainly the primitive dominance of the local flexor tone over the extensor tone. The force of gravity is too feeble to modify these fixed attitudes, but sleep usually relaxes them.

And if the affected members are not rendered immobile unsupported they display a coarse tremor, affect the extremities more than the head, the forearm and wrist more than the hand, the leg and ankle more than the toes. It is coarser, and more irregular than

the typical Parkinsonian tremor. This tremor reaches its height when the rigidity scarcely suffices to limit the range of movement. It is always preceded by rigidity, and disappears when the rigidity suffices to immobilize.

The three tone variables, the extent or intensity, the duration, and the frequency of the enhancement or diminution of the elastic state of the contraction in muscle, we have considered at the lowest or neurochemical level; and we have briefly sketched the course of the alterations in these variables from the psychic level. Throughout, I think, the plastic changes in the musculature arise from a liberation of energy due to cessation of preëxisting nervous inhibition of tone when the tone is enhanced, and to a conservation of energy due to increase of preëxisting nervous inhibition when the tone is diminished. The prevailing local tone of any muscular area is a vegetative function. The prevailing general tone of the whole musculature is largely determined by the mental state, by the existing affective condition, of which the desired posture is merely one muscular expression. We have been slow to realize the vegetative quality of the muscular organ, and we have been still more reluctant to consider movement as an emotional expression. I have therefore ventured to give this brief sketch of motor actions and reactions, in the hope that your observations will fill in the obvious gaps in our knowledge of muscular action, and will clear up what is still mysterious about the wondrous ways in which men move in health and in disease.

BOSTON ORTHOPEDIC CLUB AND BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

COMBINED MEETING, DECEMBER 15, 1924, C. MACFIE CAMPBELL,
M.D., PRESIDENT, IN THE CHAIR

CASES TREATED BY SYMPATHETIC RAMISECTION BY DR. N. D. ROYLE

DR. BRONSON CROTHERS

Two cases of paralysis were operated on by Dr. N. D. Royle of Australia on October 29, 1924. These cases were selected from some twenty-five cases showing varying degrees of spasticity mostly due to birth injuries, examined by Dr. Royle and Dr. Hunter. The cases selected for operation showed the typical characteristics which made Dr. Royle and Dr. Hunter feel that they were suitable for operation.

The first case was a boy eight years old with spastic paraplegia dating from infancy and presumed to be due to a midthoracic incomplete lesion of the spinal cord. The arms were normal and the intelligence unimpaired. A year ago he had been operated on by tenotomy of the adductors without much improvement. The right leg was chosen for operation as showing greater plastic tone. On the whole this was also the less useful of the two. Since operation the boy

has had consistent muscle training and is distinctly more compensated than he was at the time of the operation. On the other hand, there is no evidence that the physiological situation is in any way different from that seen before the operation. He still has active clonus, the characteristic stepping-up reflex on tapping the patellar tendon and some definite spasticity of gait. On the other hand, the leg is no longer more awkward than the other, and it is at least arguable that clinically there has been improvement which should be attributed to the operation.

The second case is a girl of twelve with a right hemiparesis due presumably either to birth injury or very early encephalitis. She is of normal intelligence and has always been able to take care of herself and get about. She has had occasional epileptiform convulsions. The whole right side shows marked atrophy and there is stiffness and awkwardness of the right arm. The reflexes are moderately increased, and Dr. Royle was able to demonstrate increased plastic tone. Following operation this child also has had consistent muscle training and in the opinion of those who are carrying on the treatment she is showing rather more improvement than she did in any equal period of time before the operation. You can now see the present condition. (Patient demonstrated.) The reflexes are not appreciably different from those seen before the operation and the only definite statement that can be made about the case is that there is considerable increased speed in going through the various motions which make up muscle training regime.

The conclusions seem fairly obvious that in the first place the field for the operation is an extremely limited one. Neither Dr. Royle nor Dr. Hunter feel that either of the cases reported here were ideal ones for operation, and they felt quite frankly that the operation might not produce a great deal of benefit. On the other hand, these cases were selected from among some twenty-five picked out as being likely to meet the specifications laid down. In my opinion the clinical results in these cases are at least inconclusive. The physiological changes do not seem to me to be demonstrable at all.

Discussion: DR. A. FORBES: The physiological basis for the procedure of ramisection is in the first place founded on the histological observations of Boeke, recently supported by Dart, purporting to show that skeletal muscle fibers are innervated by sympathetic nerve fibers as well as by the well recognized motor neurons arising in the anterior horn cells. On the basis of these anatomical findings Langelaan built up a theory that tonus in skeletal muscle depends on the sympathetic innervation and that the tonic contraction is different in kind from the ordinary twitch or brief contraction evoked by the medullated motor neurons. In support of this theory he performed many experiments in which he measured the elasticity and plasticity of muscle when subjected to stretching under various conditions. The foundation furnished by these experiments for the theory seems to me wholly inadequate, consisting apparently in nothing more substantial than the superficial difference between

the brief twitch resulting from a single artificial stimulus and the more gradual contraction observed in the case of certain tendon reflexes. This difference in time relations may readily be explained in the manner indicated by Liddell and Sherrington as resulting from a gradual increase in the number of constituent fibers of the muscle becoming involved in the response, without recourse to any assumption of a dual function in the muscle fibers. Furthermore, Langelaan in seeking support for his theory of tonus as distinct from contractions evoked by stimulating medullated nerves, seriously misconstrued certain statements and observations of Keith Lucas. He cites Lucas as having found three different kinds of *contractile* substance in skeletal muscle, whereas Lucas clearly stated that he found three *excitable* substances, one of which he identified as the nerve fibers within the body of the muscle—obviously not to be classed as a contractile substance. The contraction of the muscle was the same in Lucas's experiment, no matter which excitable substance was acted on by the stimulus. Elsewhere Langelaan refers to Lucas's experiment in which he showed the stepwise increase of muscular contraction with increasing strength of stimulation as evidence of the all-or-none law of muscle response, as regards individual fibers. Langelaan, ignoring the essential feature of this observation and drawing an arbitrary curve through the vicinity of the points on Lucas's graph, uses the results to prove a mathematical correlation between strength of stimulus and magnitude of response of the entire muscle, which is obviously meaningless in view of the all-or-none law. De Boer, in experiments going much more nearly to the heart of the matter, gave evidence indicating a loss of tone in the muscles of a cat resulting from the destruction of their sympathetic innervation. Bayliss's observation that heat production in decerebrate rigidity is less than in equal contraction artificially induced, has been cited in support of the theory of tonic response to sympathetic innervation. It is conceivable, however, that this economy of heat production may be explained in some way through the rhythm of the motor nerve impulses involved and perhaps also by virtue of the alternation of activity and inactivity among the individual fibers. Both Dusser de Barenne and Cobb, working independently with decerebrate cats, found no consistent difference in the rigidity between those muscles whose sympathetic innervation had been destroyed and those in which it had not. Cobb also stimulated the sympathetic fibers without evoking any visible contraction in the skeletal muscles. He further called attention to the asymmetrical influences of proprioceptive impulses from the neck muscles, reported by Dusser de Barenne, as furnishing a possible explanation of the alleged effect on the sympathetic nerves.

Hunter, in the experiments in which he found so marked a difference in rigidity between the muscles whose sympathetic innervation had been interrupted and the control muscles on the opposite side, severed the sympathetic rami some days beforehand. This procedure may well have induced vascular changes which might easily disturb the functions of the intramuscular receptors. It has

been well established by Sherrington that decerebrate rigidity is a reflex which depends, among other things, upon the integrity of the afferent path from the intramuscular receptors to the center. Alteration of these receptors by vascular changes may conceivably have sufficed to abolish the rigidity. Such an explanation would in no way involve the theory that tonus depends upon a sympathetic motor innervation. Dr. W. B. Cannon states he has recently observed in several experiments on decerebrate cats that rigidity is often marked in a fore limb after its entire sympathetic innervation has been destroyed. This observation confirms those of Cobb, in showing that decerebrate rigidity can clearly exist in absence of the sympathetic nerve supply of the muscle involved. Furthermore, both Buytendyk and Forbes and Cattell have published electromyograms of the skeletal muscles of a cat in decerebrate rigidity, showing the same sort of pattern of action currents that is commonly found in reflex and voluntary contraction. This evidence also tends to place decerebrate rigidity in the class of contraction evoked through the medullated motor neurons. In decerebrating a great many animals I have been struck by the fact that the amount of rigidity differs greatly between the two sides of the animals, depending probably in part on the postural reflex effect, already mentioned, arising in the neck muscles and perhaps also on other unknown and uncontrolled factors. In view of these large accidental variations and the evidence accumulated by Dusser de Barenne, Cobb and Cannon, showing presence of decerebrate rigidity after the interruption of the sympathetic fibers and absence of any contraction on stimulating them, I cannot help being extremely skeptical about the entire physiological foundation for this procedure. Even if it be ultimately proved that the sympathetic motor fibers can activate some mechanism in the muscle fiber which gives rise to a slight degree of tonic activity, it is clear that this mechanism cannot account for the strong contractions observed in decerebrate rigidity.

DR. E. W. TAYLOR: If it is true that cutting of the sympathetic rami leads to a loss of plastic tone, is it also true that stimulation of the same sympathetic fibers leads to an increase of tone?

DR. FORBES: So far as I know this has not been demonstrated.

DR. TAYLOR: This seems to be an argument against the hypothesis which Drs. Hunter and Royle have advanced. If it is true that cutting leads to a decrease of plastic tone, it would appear that stimulation should lead to an increase.

DR. P. BAILEY: I am particularly interested in the spinal case of which Dr. Crothers spoke. The patient had before the operation a most beautiful picture of plastic tone. After the operation, in my opinion, this tone was unchanged. It has been repeated often that this boy was not a suitable subject for the operation. In my opinion he was a perfect subject. According to the theory on which the Royle-Hunter procedure is based, plastic tone is a reflex phenomenon with its afferent pathway in the posterior roots of the spinal nerves, its final efferent pathway in the gray rami communicantes, and con-

ditioned by pathways within the central nervous system extending up as high as the midbrain. Interruption of this reflex arc in any part of its course is bound to disturb plastic tone, and cutting the gray rami communicantes must result in loss of plastic tone in the parts innervated by the rami cut, according to the theory. Royle has said repeatedly, and others repeat after him, that spinal lesions are not favorable for ramisection. Why did he say this? He did not say that it was more difficult to get a reduction of plastic tone by ramisection, when there was a lesion of the spinal cord for to have said so would invalidate his whole theory, since ramisection in every case cuts the final motor pathway of the reflex. In order to understand we must go back a little further. The defect in motor function resulting from lesions of the central nervous system is due to many causes: (1) loss of voluntary motor impulses, (2) disturbance of joint and muscle sense, (3) fibrosis around joints and tendons, (4) increase of plastic tone, (5) mental defect, etc., etc. It will be noted that increase in plastic tone is but one among many disabling factors. The purpose of the Royle-Hunter procedure is to remove this one disabling factor of increase in *plastic tone*, so that the patient may have a better chance to overcome the *other disabling factors*. Obviously if his motor cortex is destroyed, if he is an idiot, or if his joints are ankylosed, it will do him little good to reduce his plastic tone, and this is just why Royle said spinal lesions were unfavorable, for the diameter of the spinal cord is so small that it is rare to get a relatively uncomplicated increase in plastic tone from a spinal lesion.

The operation and the theory on which it is based will stand or fall on the immediate reduction of plastic tone following the operation, for this is its only indication, and for this purpose a spinal lesion is as good as any other. I say the *immediate* reduction of plastic tone, since plastic tone is a reflex phenomenon. That the patient does or does not have better motor function six days, six weeks or six months later is entirely beside the point and must be explained by extraneous factors. To return to the patient, he had an evident increase in plastic tone in his lower extremities after the operation. There is, of course, the possibility that Dr. Royle missed the rami, since he was operating in a strange clinic.

DR. CROTHERS: My own point of view is this: if one begins to go against accepted physiological explanations one is liable to get into trouble. The physiological explanation of Dr. Royle and Dr. Hunter is a broad challenge to physiological ideas. I should want very convincing evidence before advising the operative procedure recommended. In order to get cases for examination by Dr. Royle I went over the records of two hundred and fifty cases of cerebral palsy and selected twenty-five for discussion at his clinic. From these the two reported were chosen. The improvement in one case is definite but not unusual; the other is entirely unchanged. Clearly the operation should at least be limited to an extremely small group of cases.

TREATMENT AND RESULTS OF OPERATIVE REPAIR
OF THE PLEXUS IN OBSTETRICAL PARALYSIS

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To give a foundation for the discussion of the surgical treatment of obstetrical palsy, it is necessary to review the etiology and pathology of the condition. Practically the sole etiological factor is traction. From the anatomical distribution of the nerve roots, this traction, which is caused entirely by the separation of the head and neck from the shoulder on the damaged side, involves first and most seriously, the upper roots; and according to the degree of traction and its persistence the roots will be damaged from above downward more or less completely. In a few instances traction is exerted in the opposite direction, causing so-called lower arm, or Klumpke, paralysis. In a certain percentage of cases one or more nerve roots will be avulsed from the spinal cord. In experimental lesions this type of avulsion occurred six times out of twenty experiments. In operative cases the posterior root ganglia have been found extraspinally in a number of cases and there has been clinical evidence of avulsion in a fair percentage of others.

The pathology will be classified as immediate, intermediate, and remote or secondary. Immediate pathology consists in the tearing of the deep cervical fascia which lies just in front of the plexus and its roots; tearing of the muscles immediately surrounding the plexus and roots, especially the scalenus; tearing of the nerve sheaths and finally of the axis cylinders themselves. In addition, there is damage to the small blood vessels which causes infiltration of the entire damaged zone with blood. The extent of the paralysis will depend upon the degree and distribution of this type of pathology. The intermediate pathology results from the cicatrization of the damaged blood infiltrated structures. This cicatrix gradually hardens and contracts and interferes with regeneration of nerves both by cicatricial obstruction within the nerves and cicatricial compression of the nerves from the outside, causing more or less permanent and complete nerve block. Remote, or secondary, pathology consists in the shortening of the muscles and joint ligaments and often in deformation of the joint ends of the bones of the extremity which result from the long continued abnormal attitudes of the extremity. Oftentimes this secondary pathology will cause a permanent handicap to the usefulness of the extremity, even after a very satisfactory spontaneous regeneration of the nerve roots has occurred. It is important to remember that the primary and secondary pathological lesions may vary from the very slightest overstretching to one of the nerve roots to complete rupture of all of the nerve roots. These lesions may occur anywhere from the origin of the roots at the spinal cord, down to the formation of the distal trunks derived from the plexus. Also between the two extremes of the pathological lesions there may be any number of gradations in the severity of the injury. The symptomatology is sufficiently typical so that but little need be said. It is perhaps worth while to note that in many cases of fair severity

there is primarily total paralysis of the extremity. Often where the lower roots have not been irreparably damaged, where primary complete paralysis has occurred, it is impossible to tell clinically just what the grade and extent of pathological damage is.

In cases where there is the so-called Horner syndrome present, namely, diminished palpebral fissure, slight retraction of the eye-ball, and the somewhat diminished pupil, we know that serious damage has occurred to Dviii and Ti, either close to the intravertebral foramen or else in the form of avulsion of these two roots from the cord. After a few days or weeks, in many cases, the fingers will begin to move and oftentimes the wrist. Improvement may occur slowly but steadily over a period of two years, but this improvement may be confined to the nerves of the lower three roots. Meantime, the muscles supplied by the upper two roots may show no improvement whatever. This is ordinarily a great stumbling block to proper consideration of surgical treatment. Many men advise waiting while there is any continued improvement. Such has been the case in a number of instances where operation has disclosed complete rupture and separation of the ends of the upper two roots.

Treatment: My personal point of view is that treatment should follow these general lines: Primarily to place the extremity in the position which will give relaxation of the paralyzed muscles and prevent the deformities caused by the factors of remote pathology. This position, which is maintained by a brace, consists in abduction of the arm to 90 degrees, flexion of the elbow to 90 degrees, almost complete supination of the forearm and hand with extension to a straight line of the wrist, hand and fingers. For the first three or four weeks (that is, until the evidences of traumatic neuritis have disappeared) the extremity is kept continuously in the brace. After this time the brace is removed once or twice a day for massage and manipulation, care being exercised not to pull the shoulder away from the neck during these manipulations. In cases where spontaneous recovery is going to occur there should be return of motion in practically every one of the muscles by the end of three months, even though motion may be very slight in degree in the upper arm. In certain cases which go on to reasonably satisfactory recovery, these motions may not have appeared until four or five months have passed. In cases which are going to make complete recovery, the nerves have shown very marked evidences of regeneration throughout the plexus at the end of three months. If such recovery has not occurred by that time, there is almost sure to be *some degree of permanent defect*. There is no disadvantage in waiting for six months, or even a year, if the position above described is maintained and if physical therapy is systematically used during the period. If the recovery is far from complete by the end of six months, it is my opinion that surgical interference is indicated, although this interference may be deferred until the child is a year old, if there is reason for it.

Many men who have been interested in these cases maintain that there is no reason for surgical treatment inasmuch as the less severe

cases get well spontaneously and the more severe cases are beyond help by surgical treatment. From consideration of the pathological lesions described, it is obvious that there must be a considerable number between the mild cases where spontaneous recovery occurs and the hopeless cases where nothing will do any good. In the latter group removal of the cicatricial compression from the outside and removal of the cicatricial blocks from within the nerve is sure to give much better opportunity for nerve regeneration and recovery of nerve function than mere tentative treatment with physical therapy. My experience has thoroughly convinced me that surgery has a very definite place in the treatment of these cases. Exploration can be done with practically no risk to the child. A skin incision 7 cm. in length with separation of the fat pad overlying the plexus, brings one down upon the surgical field. Further procedure consists in the careful removal by dissection of the cicatricial tissue surrounding the roots and plexus; separation of the cicatricial adhesions between the damaged muscles and nerves, and finally by the removal of such macroscopic cicatricial lesions as involve the nerves themselves. These procedures are followed by end to end suture of the nerves from which portions have been resected. The wound is then closed and the child is put up in the brace in the position previously described. The child is kept in this brace continuously over a period of three months after which the extremity is taken out of the brace daily for massage and manipulation until such time as voluntary motion, of fair degree, has occurred. The brace is then left off more and more during the waking hours and is put on during the sleeping periods in order to prevent occurrence of the so-called remote pathology. If operation discovers no macroscopic damage in the nerves themselves, mere removal, by dissection of the cicatricial tissue has frequently caused very great improvement in the functional value of the extremity. If no macroscopic damage is discovered, then the operation consists merely of a skin incision and separation of the overlying fat pad. This involves no damage and no risk to the child. If actual lesions are found, then any risk which is involved is more than justified by the results to be derived from the nerve repair.

(A series of lantern slides were shown to demonstrate the points made in the presentation. In one group in particular in which there was total paralysis which had persisted during eleven months of the child's life, the plexus was one solid mass of cicatricial tissue which was removed and an end to end suture performed. This child, at the end of thirty-one months, was using the extremity, having motion in practically all of the muscles and sufficient strength to do any necessary acts. Starting from nothing, it was obvious that the entire improvement was due to surgical interference.)

Results in my group of operative cases, numbering fifty-nine, showed that in no case was the patient rendered worse by operation, except that during the period of two or three months immediately after operation there was naturally some loss from the resection of the nerves, but in no case did the patient fail to get back to at least the position he had been in preceding operation.

In addition to surgical work on the plexus, the use of the Sever operation has been of much value in overcoming the handicap due to deformities resulting from "secondary pathology." Of the fifty-nine cases only forty-seven could be traced sufficiently long to get results. Of these forty-seven, thirty-eight or 81 per cent, show very definite improvement. Three cases, or 8 per cent, were cured, the one extremity being as good as its opposite. Seven cases, or 18 per cent, were almost cured, having only a very slight handicap about the shoulder girdle. Twenty-one, or 55 per cent, showed marked improvement. Seven, or 18 per cent, showed moderate improvement. Of the remaining cases, six, or 13 per cent, showed no improvement. In three cases the lower roots were avulsed from the cord.

Mortality: Of the fifty-nine cases two, or 3.4 per cent, died on the table; one from hemorrhage; one at the end of the operation when apparently everything was going perfectly well and the brace and dressings had been bandaged on, suddenly stopped breathing and could not be resuscitated; one died two weeks after the operation from gastroenteritis.

From the material presented I am firmly convinced that there is a definite field for operative surgery in the group of obstetrical palsy cases and that the only problem is to determine the selection of cases in which operation is indicated and the time at which it is best to do the operation. My opinion is that the best time for operative interference is between six and twelve months of age. Many of the earlier cases were operated upon at or before the three months' period, but later experience has shown that some of these cases will make so good spontaneous recovery as to avoid the necessity of operation, and since the present mode of tentative treatment eliminates most of the handicap from waiting, I feel that it is legitimate to postpone operation even up to one year of age. Nevertheless, many of the cases have been of ages varying up to fourteen years, and even in these older cases much improvement has been gained by proper nerve repair, and this gain is much increased by the use of the Sever procedure in addition. One case which was eighteen years old, with a bad birth palsy, was operated upon but no improvement was obtained even after several years of persistent treatment post-operatively.

Discussion: DR. J. J. THOMAS: The subject of obstetrical paralysis has interested me for a good many years. First in regard to the pathology of this condition. No one who has seen the plexus exposed in one of the severe cases of this type of paralysis can possibly have any doubt that the plexus has been injured, and severely, the only doubt being as to the mode of the production of the injury, and I agree with Dr. Taylor that in most, if not all, of the cases it is by stretching. The injury of the plexus is so severe that one must always bear in mind what Dr. Taylor has said, that in excising the injured portion of the plexus one must cut back the nerve cords till normal nerve fibers are found before proceeding to suture, if one expects to get favorable results from a resection of the plexus. The theory that these paralyses are due to a dislocation of the head of

the humerus, with hemorrhage around the nerve trunks in the region of the shoulder joint which has been advanced by Dr. Turner Thomas of Philadelphia, finds no support from the condition of the plexus seen at operation, nor can it be entertained for a moment by any one who knows the grouping of the muscles in the cords of the plexus and has observed the same grouping of the paralysis and of the atrophy of the muscles in the infants seen soon after birth when the paralysis is most marked.

These paralyses vary in extent, and we group them into the upper arm type, the lower arm type, and the total paralyses, of which the first is by far the most common. The greatest practical difficulty we have, however, in deciding in any type of this injury as to whether a resection of the plexus is advisable in any individual case or not depends upon the fact that these lesions are seldom complete, and after the original injury produced by the stretching of the plexus there is almost invariably a partial recovery. In the cases in which the paralysis at first affects all the muscles, later we may find remaining only a paralysis of the upper arm group of muscles, and even this may be partial only. Where there is fair recovery of voluntary motion in most of the affected muscles the greater part of the disability found later comes from the secondary contractures which appear in the unaffected muscles, the opposing muscles to the paralyzed ones. These contractures are usually most marked in the subscapularis and the other internal rotators of the humerus, and limit the motion at the shoulder and in the forearm as supination and are the cause of the deformities of the elbow, the acromion and the partial dislocation of the shoulder which we so often see in the neglected cases as they grow older. When these contractures and deformities have been corrected, as by the operation devised by Dr. Sever in our work at the Boston Children's Hospital, we can by the development of the weak muscles, by exercises, obtain a relatively very useful arm, even in neglected cases, without resorting to resection of the plexus.

Perhaps in Boston we have used the operation on the plexus too seldom because of the good results we have seen from the use of these other methods and because we have restricted the plexus operation to the very severe cases we have estimated its value too low. In the very severe cases in which the nerve roots have been torn from the cord it is, of course, impossible to get good results from a suture of the nerve trunks of the plexus, as the remaining nerve roots cannot give good motion to all the muscles of the arm. What then should be our guide in choosing the cases in which to operate upon the plexus? If we do this operation in all cases, operating early, it seems to me evident that we shall operate in many cases where we should get an almost perfect recovery by the use of exercises and overcoming contractures, if they cannot be prevented from forming, by operations directed to this end. On the other hand, to wait too long means that we allow the most favorable time for nerve regeneration to pass. This question probably cannot be answered absolutely correctly in every case. From my experience I should

say that if we delay exploration of the plexus for a year we are not delaying too long to get good results after a suture of the nerve trunks, while we can be sure that after the lapse of two or three years the possibility of regeneration of the nerve trunks grows less rather rapidly. I feel that each case should be watched closely for return of motion in the paralyzed muscles and for the increase of strength in them, and if recovery is very slight or after a time comes to a standstill, then we should at once proceed to an exploration of the plexus, prepared to excise scar tissue and to do nerve suture to the best of our ability in that particular case. I know of no one who has had greater experience in doing these operations than Dr. Taylor or one who can help us more in the technique of these difficult operations in young children than he, and we should all give great weight to his advice to resort to this procedure more frequently than is generally done. Of course, where this resection is required the operations for overcoming contractures and deformities of the joints are still to be employed, if we are to get the full benefit of the improved power in the weak muscles, and we must develop them to the greatest possible extent by the use of exercises; for without proper after-treatment all operations will fall into disrepute in these obstetrical paralyses. So the operation of Dr. Sever still has a much wider field in these cases than any operation on the plexus, since it is of use in older children and neglected cases; this, and other methods to overcome deformities, and the persistent use of passive movements and exercises still constitute the indispensable methods which must be employed for all of these cases in order to produce the best results.

DR. J. E. GOLDTHWAIT: The cases shown by Dr. Taylor are very suggestive and lead one to a further study. One thing I would like to suggest, as my part of the discussion is, as Dr. Taylor says, that the majority of the cases when they come to us come in conditions which indicate very definite neglect on the part of those who have been responsible for the child prior to its coming to us. The majority of them, cases of any degree of severity at all, have flexed elbow which invariably means inwardly rotated arm. Any one with a flexed elbow will carry the arm forward. The dislocation of the humerus is largely secondary to the plexus. I, personally, feel that we should be just as much ashamed of flexed elbow as part of the development of an obstetrical paralysis as we should be of an equinus position of a foot in an infantile paralysis. Whenever that has occurred I have been impressed, in all cases we have been handling, to see how far it is possible to stretch the flexed elbow so that the hand will hang at the side with the arm straight; one may then unrotate the shoulder and improve the function there many times without having to do the Sever operation.

We have one child at present, ten years of age, who had a perfectly typical inwardly rotated arm and pronated hand. The flexed elbow has been entirely straightened and the position of the hand, as far as inward rotation of the shoulder is concerned, has materially improved.

DR. J. S. STONE: I agree with practically everything Dr. Taylor has said except upon one point. He stated that in his experimental work a complete avulsion of the roots was common. In experimental work which I did a good many years ago I found that this was rather uncommon. In accidental injury, however, I have found avulsion more common than he has. It seems to me that Dr. Taylor's cases must have been chosen with great care. Certainly where the fifth and sixth roots are completely torn across the only logical procedure is an attempt to unite them. His cases must have been carefully selected, if, as he has stated, there are no cases in which there has been an impairment of the motion which they already had. If these roots had not been completely torn, there must have been at least a temporary loss of motion. We have had several cases in which there has been a complete avulsion of the plexus. In some of these no roots at all could be found. At times, the whole plexus has been snapped down below the clavicle. In a great many cases suture of the damaged roots is the only logical treatment. These cases should be picked out and suture advised. Many more cases should be operated upon by this method than are operated upon at present.

DR. J. W. SEVER: I am very much encouraged by Dr. Taylor's paper. He has had remarkably good results; much better than any I know of in this community. I was also pleased and encouraged to find the cases that had had the plexus operations were cases of practically the whole-arm type, that is, where the plexus at the upper roots and lower roots as well had been injured. In our experience we find we have quite as good results, or very satisfactory results in these cases, without any plexus operation. We have in part educated this community to get the cases to us early, that is in the first week or two after birth, and we are now getting at the Children's Hospital a great many cases in the first few weeks of life. We have found the universal use of the splint which holds the arm in an abducted, elevated and outwardly rotated position very helpful, but in a certain number of cases we find that the child cannot use the arm freely because of the fixation the splint gives. Some children began to develop certain swellings about the shoulder or about the elbow, pain and discomfort, and we could not account for them except by the constant fixation of the splint between treatments; in certain individuals, therefore, we gave up the splint and simply let the arm hang at the side; those cases have seemed to do very much better. As a result of certain discussions from Philadelphia we induced Dr. Crothers to undertake a series of tests for reactions of degeneration in these young babies, and we found it present in all of them.

With regard to the question as to the advisability of operating on whole-arm types, the points of importance are the inequality of the pupil in relation to the injury. In general, such pupillary inequality clears up in five or six weeks, indicating that the plexus is not so badly injured as was suspected. Where it can be shown that there is a definite avulsion of the eighth cervical root and the

first thoracic, there is no possible hope of repair or regeneration either by physiotherapy or operation. If it is evident that a hand has been functionally injured beyond hope, operation of any sort is, of course, not to be considered. In regard to the muscle contraction operation which we are doing at the Children's Hospital we have found that results are decidedly better, if we do not operate when we first see the case. We give them preliminary treatment for five or six months, massage, exercise, functional activity and work with the hand.

I should like to ask Dr. Taylor about his after-treatment in these plexus operations to find out what his period of fixation and after-care has been. The conclusions I have reached are based on the results of the study of 1,033 cases of obstetrical paralysis.

DR. W. J. MIXTER: The procedure which has been described has been attempted for many years, has been tried in many hands, and has been used perhaps ill-advisedly at times. In Dr. Taylor's hands the procedure has been used wisely. He has selected his cases far better than we have selected them during the years in which I have been interested in this subject; his technique, furthermore, is worthy of the highest commendation. His facility in handling the brachial plexus in children is very different from what I had believed could be accomplished. The application of sutures and the significance of the shortening position are matters of importance. Evidently the care of the cases before and after operation is of the greatest importance and training is absolutely essential to good results. Dr. Taylor's suggestion that it is desirable to wait a certain length of time before attempting operation should be generally adopted. The Sever operation is unquestionably a very variable procedure. Exploration should be more generally undertaken under proper conditions. If conditions cannot be improved, no harm is done. The mortality is exceedingly low, and if nothing is attempted, the disability is often great.

DR. R. B. OSGOOD: Dr. Taylor asked me to speak of one case I had the opportunity of seeing. The original operation had been performed and some improvement has resulted. There was a lapse of a good many years, three or four, when another attempt was made in this complete lower-arm type by Dr. Taylor which resulted in still further improvement.

DR. A. S. TAYLOR: Occasionally I have seen cases where I was willing to state that there had been very little or no improvement. Occasionally cases will show remarkable improvement that one would not expect. No two pathological conditions are exactly alike. One cannot group these cases satisfactorily because they do not fall into groups. If the child is born with nerve palsy but moves the hand or the wrist at birth, it is perfectly definite evidence that the seventh root has not been damaged. I would not consider those cases where the hand moves at the beginning as of a very serious type. To my mind, the very serious types are those where there is no motion at all and where one does not begin to get evidence of recovery for two or three months. One may be almost sure those cases will not

make complete recovery under any kind of treatment, but they will make the best percentage of recovery if they are given physical therapy plus nerve repair. If one explores a plexus and finds nothing to be done, one has taken twenty-five or thirty minutes, has lost no blood, has learned a great deal, and the child has lost nothing. If something is found to do surgically to the plexus, time has been saved and whatever risk has been taken is more than justified by the prospect of doing some real good.

A number of the men in discussing my remarks stated that I picked my cases very carefully. I do not know how I gave that impression because I have taken them just as they came, and when I have advised operation it has always been on the basis of every case that came along where I thought operation was indicated. I have operated on a good many where I thought I was not going to get much; in the case of which Dr. Osgood spoke, the child had been treated for two and a half years for an extremity which at the end of that time had no functional value. We found that the first and eighth roots had been avulsed from the cord. Operation was the only chance of giving the arm any functional value whatever. The child referred to is getting a certain amount of use out of that extremity. If there is too long delay before operation, the more difficult the dissection becomes. If a young child is operated upon where the indications are perfectly clear, say between six weeks and three months, dissection is relatively easy because the cicatricial tissue has not solidified, and the operation is, therefore, very much simpler than in later cases. I am much interested in Dr. Goldthwait's discussion of flexed elbow. I cannot believe flexed elbow is the cause of dislocation of the shoulder because I have seen a good many cases where dislocation of the shoulder preceded flexed elbow. I should be glad to learn how those elbows can be straightened, the technique and length of time needed, since it would add very materially to the value of an extremity, if complete extension could be recovered.

Dr. Stone thinks I choose my cases on the basis of operating upon the worst type. This is not correct. There has been no selection on such a basis; probably fifty per cent would prove to be upper arm type.

With regard to after treatment of the operated cases. It has been my custom to put them in a brace which holds the extremity in the same position as Dr. Sever's and to keep them there for three months without taking them down for a moment. I also always hold the head toward the damaged arm in order to keep it braced to prevent any strain on the nerve suture and to prevent any motion of the operated area. I keep the head in position for three weeks because by the end of that period we have very good surgical union in those nerve stems. I also keep the brace on after the headpiece is taken off because there will be very little, if any, evidence of nerve regeneration in the paralyzed muscles until at least three months have elapsed. At the end of that time the union would be solid, and nerve regeneration, if it were going to occur, would have

advanced sufficiently far so that there would not be any increase in cicatricial tissue at the nerve point. It has been my custom after the three months have elapsed to leave the brace off during the waking time of the child and have the brace on only when it is sleeping. Then I prescribe physical therapy. Nerve regeneration itself was not sufficient to give any balance to the muscles so that they would develop exactly the same deformities one had before operation; in order to prevent that I have had them use the parts during the waking hours. Leave the brace off during the waking time so that by the voluntary motion they were getting they could develop to best advantage; use the brace during sleeping time until the child develops sufficient power in the various muscles to render the use of the brace no longer necessary to prevent deformity.

With regard to treatment of the upper arm type in which Dr. Sever has shown beautiful results with release of shoulder tissue I think two types must be recognized; one with good degree of motion and well developed muscles and normal looking arm but with some limitation of motion. In that type it appears as though nerve regeneration had begun. There is another group, such as the ten-year old boy I mentioned, where there is motion in slight degree and where there is some deformity but where the muscles are small. Oftentimes one has motion but no strength. In these cases it has been my experience that if I dissect the plexus I shall find it compressed by a large amount of cicatricial tissue which, if possible of removal, will give increase in strength and muscular development.

Referring to Dr. Sever's discussion I have found that avulsion of the roots is fairly frequent; out of twenty cases there were six where either one or two roots had been avulsed from the cord. Six out of twenty is fairly high, and it has been my feeling that while there were a considerable number of avulsions probably they were not more than twenty-five per cent. As far as I could make out from looking over my statistics my avulsions were about ten per cent on living subjects. With regard to impairment when I was speaking about those cases where we got no change but where we had done no harm I referred to the final outcome. We got a temporary loss but in no case did we have a young child who did not regain what we started with, and in a great majority of the cases a good deal more. With regard to waiting before operating, my only objection is that the dissection is more difficult. We have been carrying a good many children over a period of a year to see what could be done, before I advised operation, and in some cases one will get so far along at the end of six or eight months that operation is inadvisable. In some others at the end of a year one has nothing like a satisfactory arm and operation may give immediate improvement, surely justifying the operation.

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY.

1. VEGETATIVE NERVOUS SYSTEM.

Marinesco, G., and Draganesco, S. THE MOTOR NUCLEI OF THE VAGUS. [Ann. de Med., XIII, 1923.]

G. Marinesco and S. Draganesco describe a case of thrombosis of the right vertebral artery, with resultant areas of softening in the right half of the medulla. There was paralysis of the right vocal cord and the right half of the soft palate, loss of the oculo-cardiac reflex on the right side, and hemiparesis affecting the left arm and leg. Examination of the medulla showed softening in the region of the right nucleus ambiguus, but the dorsal vagal nucleus was intact. From this and other evidence they conclude: (1) That the soft palate is innervated from the nucleus ambiguus by the ninth and tenth cranial nerves, and not by the seventh, as has been suggested. (2) That the recurrent laryngeal nerve arises in scattered large cells in the inferior part of the nucleus ambiguus. (3) The vagal branches to the heart appear to arise partly in the nucleus ambiguus and partly in the dorsal motor nucleus, but the evidence regarding this is very indefinite.

Ranson, S. W., Wightman, S. D., Faubion, L. R., and Ross, C. J. VASODILATOR MECHANISMS. [American Journal of Physiology, LXII, p. 283, and LXIII, p. 311.]

Relatively recent physiological researches have demonstrated the existence of vasodilator fibers and of vasodilator reflexes apart from the reflex inhibition of vasoconstrictor tone. Fibers having this function are found in the chorda tympani and nervi erigentes and, according to Bayliss, in the dorsal roots of the spinal nerves. Bayliss believes that the vasodilator fibers of the dorsal roots are identical with the sensory fibers to the blood vessels and that the dilator impulses are conducted over them in the opposite direction to that taken by the sensory impulses ("anti-dromic conduction").

In this series of papers on "Vasodilator Mechanisms" evidence is presented which confirms Bayliss' statement that there are fibers of this type in the dorsal roots. By the use of nicotine in quantities sufficient to paralyze the sympathetic ganglia it is demonstrated that the vasodilator impulses pass at some point through sympathetic synapses and that these synapses are not located at the periphery, *i.e.*, in or upon the vessels themselves. The suggestion is offered that there may be a synaptic interrup-

tion of the vasodilator path in the spinal ganglia. It is well known that axons of uncertain origin form pericellular networks about spinal ganglion cells, which are practically identical with the pericellular baskets surrounding sympathetic ganglion cells, and it is possible that these networks may represent the synapses in question.

An effort is made to study the vasodilator apparatus with the aid of dilator substances injected directly into the arterial blood stream going to the leg. The vascular reactions in the leg are recorded by means of a plethysmograph. Marked vasodilatation can be produced by a variety of substances such as acetylcholin, histamine, nicotine and atropine. It is evident, however, that all of these substances produce their effect by direct action on the vessel walls since degeneration of all of the cerebro-spinal and sympathetic nerve fibers going to the leg does not in any way decrease the dilatation produced by these substances in the vessels of the denervated leg. These experiments do not exclude the possibility that the substances named may act on a hypothetical autonomous nerve net in the vessel walls; but from a review of the literature on this subject it is concluded that there probably is no such nerve net. Probably the substances mentioned act directly on the smooth muscle or endothelium of the blood vessels. [Author's abstract.]

Taylor, N. B., and Cameron, H. G. VOLUNTARY ACCELERATION OF THE HEART. [Am. J. Physiol., 1922, LXI, 385. Med. Sc.]

Cases of direct voluntary control of the heart are rare. The paper records observations on one such case, a healthy young man (one of the authors) who was able to accelerate his heart from about 70 beats to 110 or 120 without any preliminary emotional effort by an effort of the will alone. The interesting manner in which the subject developed this capacity is described. The observations show that acceleration was accompanied by phenomena associated with sympathetic excitation, such as vasoconstriction, elevation of blood pressure, dilatation of the pupils. Glycosuria also occurred as an after-effect, but curiously enough no change could be detected in the blood sugar. It is concluded that voluntary acceleration is not due alone to vagal depression as is generally supposed, but also to stimulation of the sympathetic accelerator nerves.

Pal. ARTERIOSCLEROSIS AND ARTERIOLOSCLEROSIS. [Wien. klin. Woch., July 27, 1922, XXXV, No. 30. J. A. M. A.]

Pal states that patients suffering from arteriosclerosis (with and without heart symptoms) must be compelled to watch carefully over the water balance of the organism. In advanced stages they must be put on as low a fluid intake as possible, and, at the same time, the water content of the food must be considered. For the same reason, alcoholic beverages should be used very sparingly or prohibited entirely. It should also be borne in mind that patients with arteriosclerosis are especially sensitive

to vascular poisons. Beer is detrimental because of the carbonic acid it contains. All beverages with carbonic acid should be avoided, as far as possible. In order to combat the results of excesses in the fluid intake, he prescribes for patients with arteriosclerosis a diuretic, once or twice a week. The assumption that theobromin and iodine exercise any curative effect on the process is unfounded. The belief that they reduce the blood pressure is not substantiated. Diuretin has a dilating effect on the coronary and renal arteries; also on the bronchi, and, owing to the former action, is likely to lessen high blood pressure when there are no rigid anatomic changes. Iodine cannot be regarded as a remedy in nonsyphilitic arteriosclerosis, even though it may sometimes lower the blood pressure. It should not be overlooked that following the use of iodine occasionally considerable loss of body weight results, which is not such an indifferent matter.

Kiely, Charles E. TACHYCARDIAS OF NEUROTIC ORIGIN. [Ohio State Medical Journal, November, 1922, Vol. XVIII, p. 757.]

Tachycardia among ex-soldiers was described by Da Costa soon after the Civil War and named by him "Soldier's Heart." During the World War this condition caused a significant amount of disability and after its close became a basis for many claims for compensation from the government. Tachycardias due to organic heart disease, infection such as tuberculosis, and obvious hyperthyroidism are, of course, not included in this discussion. This concerns itself with paroxysmal tachycardia without obvious cause and almost invariably induced by physical or emotional strain. The theory concerning this condition set forth by Wilson and Carroll under the title "The Nervous Heart," demanded consideration. They postulated a primary vagotonia compensated by a response from the autonomic system, the blood pressure being maintained by a more rapid pumping. Adrenalin administration should therefore relieve the tachycardia during its fleeting action but thyroid extract, which enhances the action of adrenalin three to four hundred fold, they advocated to obtain more permanent results. There are objections to the theory. Slowing of the heart on deep inspiration does not prove vagotonia as it is too common in men of the age of such patients. The drug tests for hyperexcitability of the autonomic were very loosely applied and not properly checked by normals. The therapeutic results with thyroid extract in the series reported in the present paper were distinctly disappointing. The psychotherapeutic measures adopted by Wilson and Carroll seem much more justified than the medicinal. In the series reported the removal of focal infections failed to produce any results and basal metabolic estimations did not warrant the conclusion that these were cases of unsuspected hyperthyroidism. The psychogenic origin of the tachycardias was of undeniable plainness. In many the tachycardia was a vicious circle as it caused a fear of heart disease which in turn

augmented the tachycardia. Unwillingness to recover because of monetary compensation was hardly enough buried to be called subconscious. Many patients avoided medical control; some were proved not to have taken the medication prescribed. Psychotherapeutic results were unsatisfactory due to lack of coöperation by the Veterans' Bureau in treating these cases as compensation neurosis and even creating situations calculated to exacerbate such a condition. [Author's abstract.]

Carlson, Boyd and Pearcy. REFLEX CONTROL OF CARDIA AND LOWER ESOPHAGUS. [Arch. Int. Med., October, 1922, XXX, No. 4.]

These authors show that for dogs the tonus of the cardia is temporarily inhibited by stimulation of sensory nerves in the mouth and pharynx and by stimulation of nerves in the gastric mucosa. The tonus of the cardia is increased by sudden distention of the walls of the stomach, by intravenous injection of small quantities of cocaine during gastric digestion by some factor other than the acidity of the gastric contents. The tonus of the cardia runs parallel with the tonus and hunger contractions of the empty stomach. In dogs and cats under light ether anesthesia, ether and curare, or decerebration, it is shown that reflex inhibition or contraction of the cardia and lower esophagus can be initiated by the stimulation of any sensory nerve, skeletal or visceral. When the vagi are intact stimulation of the sensory nerves in the mouth, pharynx, esophageal and gastric mucosa induces on the whole inhibition of the cardia, followed by contraction. Stimulation of the afferents from the abdominal viscera (gallbladder, intestine, urinary bladder, central end of one splanchnic nerve) induces, on the whole, reflex contraction of the cardia and lower esophagus, even when both vagus nerves are sectioned. When the tonus of the cardia is feeble, the motor reflexes into the cardia predominate, when the cardia is hypertonic the inhibitory reflexes prevail. Strong stimulation, particularly of the abdominal viscera or the central end of the splanchnic nerve, may cause strong spasm of the cardia and lower esophagus lasting from ten to thirty minutes. The authors urge that the demonstration of motor and inhibitory innervation of the lower esophagus via the splanchnic nerves, and the confirmation and extension of Opes-chowski's observations on the reflex control of the cardia and lower esophagus should be noted in clinical cardiospasm.

Smithies, F. DIAGNOSIS AND CLINICAL MANIFESTATIONS OF CARDIO-SPASM ASSOCIATED WITH DIFFUSE DILATATION OF THE ESOPHAGUS. [Am. J. M. Sc., 1921, CLXII, 313-325.]

Smithies has observed 76 instances of cardiospasm, *i.e.*, unusually strong and prolonged contraction of the cardiac sphincter associated with diffuse dilatation of the esophagus. Of 47 tabulated cases 25 were females and 22 males. The ages ranged from nineteen to seventy, the average age being thirty-nine and two-tenths. According to Smithies, the initial overstimulation to the cardia is exerted by numerous factors which

may be extraesophageal or intrinsically esophageal. The stimuli may arise from the central nervous system, from the esophagus itself, the diaphragm, the intrathoracic organs, the stomach, duodenum, gall-bladder, appendix, or other abdominal viscera. In some patients more than usually powerful contractions of the cardiac sphincter are initiated by psychical disturbance. In all but 17 of Smithies' cases the onset was acute. The duration of the symptoms averaged five to six years and ranged in individual cases from three months to twenty years. There was constant dysphagia in 45, dysphagia to fluids only in 21, to solids only in 14, and to both in 12. Dysphagia was almost always accompanied by vomiting or spasmodic regurgitation of food. The vomiting was usually sudden, frequently explosive, and very often occurred shortly after the ingestion of food. Loss of weight ranging from 10 to 82 pounds occurred in all the patients, the average loss being 29.2 pounds. Normal bowel movements occurred in 47 per cent. In the remainder there was obstinate constipation. Smithies maintains that under proper treatment clinical and functional recovery takes place in 70 per cent, improvement in 20 per cent, and no benefit in 10 per cent.

Korns, H. M. DELAYED CONDUCTION THROUGH RIGHT AND LEFT BRANCHES OF ATRIOVENTRICULAR BUNDLE. [Arch. of Internal Medicine, 1922, Vol. XXX, p. 158.]

The author discusses the usual mistakes of older methods and reports a case in which electrocardiograms parallel in a striking fashion those seen in experiments. Attention is directed to eight similar cases in the literature. If the refractory period of the right or left branch of the atrioventricular bundle is longer than the refractory period of the A-V node, conduction through that branch is delayed provided the rate of impulse discharge from the ventricular pacemaker be sufficiently high. Digitalis may directly lengthen the refractory periods of the individual branches to a degree sufficient to produce delay in branch conduction.

Willins, F. A. HEART IN THYROID DISEASE. [Ann. of Clin. Med., January, 1923, I, No. 4.]

Auricular fibrillation was found on admission to the clinic in 7 per cent of patients with exophthalmic goiter and in 9 per cent of patients with hyperfunctioning adenoma. These percentages are doubled while the patient is under observation, that is, during the preoperative, operative and postoperative periods. New states that auricular fibrillation may occur as a permanent, intermittent, or paroxysmal disorder.

Hausmann, Max, and Getzowa, Sophie. A PARAGANGLIOMA OF ZUCKERKANDL'S ORGAN ASSOCIATED WITH HYPERTROPHY OF THE HEART AND KIDNEY. [Schweiz. Med. Woch., Sept. 14, 1922.]

Max Hausmann and Sophie Getzowa report the following clinical and anatomical symptom complex in a patient who died of grippe pneumonia:

a chromaffin tumor (paraganglioma) of Zuckerkandl's organ, hypertrophy of the heart and kidney, hypertension, polyuria and transient glycosuria. This apparently idiopathic cardiac hypertrophy, the authors attribute to the effect of the tumor or its adrenalin, and they designate it as cardiac abnormalities of the adrenalin heart. The myocardium showed changes, which have also been found in the hypertrophied hearts of rabbits following intravenous injections of adrenalin (isolated indurated foci, partial diffuse sclerosis and an extreme hypertrophy of the muscle fibers); there was no vascular sclerosis. The symptoms of cardiac hypertrophy and of hypertension clinically suggest chronic hypertensive renal diseases and hypertensive arterioscleroses with cardiac hypertrophy and the polyuria and glycosuria suggest diabetes insipidus and so-called innocuous diabetes. Therefore, a hyperadrenalinism or an adrenalin heart must be considered in hypertonic cardiac hypertrophies, which results from a tumor or a hypertrophy of the chromaffin tissue. The authors consider such a tumor as related to the endocrine adenomas, some of which are characterized by a capillary network with masses of cells in its coils. These include certain tumors of the hypophysis, the thyroid, the parathyroids, the chromaffin tissue and the cortex of the adrenals; also the so-called hypernephroma. The endocrine adenomas may have hormonal action.

Daniélopou and Hristide. NEURECTOMY IN ANGINA PECTORIS. [Bul. d. 1. Soc. Méd. des Hôp., January, 1923. J. A. M. A.]

Daniélopou and Hristide anesthetized the second and third left spinal nerves in a case of angina pectoris in which the pains corresponded to the area of these nerves. While otherwise the slightest effort caused attacks, none occurred, in spite of the dyspnea, during the anesthesia. They propose therefore the resection of the roots of the nerves corresponding to the pains in this condition (from the eighth cervical to the fourth dorsal).

2. ENDOCRINOPATHIES.

Simonin, P. TOXIC EFFECTS OF HELMINTHIASIS AND THE ENDOCRINE GLANDS. [Rev. méd. de l'Est, May 1, 1922, p. 314, B. M. J.]

This paper enumerates the cardinal symptoms of helminthiasis, and states that recent discoveries regarding "foreign proteins" have considerably expanded our knowledge of the toxins resulting from the presence of intestinal worms. These include every poisonous substance or group of substances which may give rise to symptoms in the patient, whether resulting from the secretions of the parasite, from its metabolic activity, or from disorders of the patient's metabolism produced by the presence of entozoa. The author claims that clinical observations regarding the interference of these toxins with the functions of the endocrine glands

have been fully confirmed by recent experiments. He considers that the well known fact that patients infested by the entozoa often lose weight rapidly, in spite of a good appetite and an apparently unimpaired digestion, is due to interference with the process of oxidation of carbohydrates and hydrocarbons, which has been noted by several observers in the course of ankylostomiasis, and that this interference arises from diminution of ferment activity which, in its turn, is the result of "glandular insufficiency" directly traceable to cellular toxic degeneration of the liver, pancreas, and suprarenals. On the other hand, the urine often contains excess of nitrogen bodies and of phosphates, showing that abnormal tissue destruction is in progress. In some cases the patient becomes cachectic from the double process of imperfect assimilation and excessive tissue destruction. In children and young people growth and development are seriously interfered with; several authors have described the physical and mental degeneration of children in Tunisia suffering from ankylostomiasis. Siccardi has termed this "ankylostomal infantilism," as in these patients the mental and physical characteristics of infancy persist beyond the age of puberty. Similar observations have been recorded by the American Commission in Porto Rico. He considers that the numerous records of cases of amenorrhea, dysmenorrhea, metrorrhagia, and abortion attributed by various authors to helminthiasis show that these parasites have a distinctly toxic action on the ovaries numerous cases having been reported by Tridonani in which abortion has taken place after complete destruction of the parasites. After quoting examples from comparative pathology, the author describes in detail the various degenerations found in endocrine glands—the suprarenals, pituitary, thyroid, testicle, and ovary—after experimental injection of fluids obtained from hydatid cysts, from ascaris, etc., and a number of plates illustrate the description. The author concludes that further observations in clinical medicine and experimental pathology will bring about a more general recognition of the part played by helminthiasis in the production of general malnutrition and systemic disturbances.

Coffen, T. H. SELECTIVE TUBERCULOUS INVOLVEMENT OF ENDOCRINE GLANDS. [Endocrinology, Jan., 1923, VII, No. 1, J. A. M. A.]

The case reported by Coffen is unique in that there was a clinical history of disturbed function of the thyroid, pancreas, suprarenals and probably the hypophysis. Necropsy showed caseous tuberculosis limited to all the endocrine glands. The following points stand out: In a man of large frame (suggesting gigantism) and with marked hirsutism, a tuberculous hypophysis was found. Peculiar bronzing of the hands and wrists and the pigmentation of the buccal mucosa, suggesting Addison's disease, was associated with caseous tuberculosis of the suprarenals. Glycosuria was definitely present more than three years before death; caseous tuberculosis of the pancreas was found at necropsy. A colloid

goiter was removed six years before death; caseous tuberculosis of the remaining portions of the thyroid was found at necropsy. A hydrocele operation had been performed ten years before death. Necropsy showed caseous tuberculosis of the right epididymis and prostate.

Hirsch, S. POLYGLANDULAR SYNDROMES. I. MULTIPLE SCLEROSIS OF THE BLOOD GLANDS. THYRO-TESTICULO-HYPOPHYSO-SUPRARENAL SYMPTOM COMPLEX (BIEDL). [D. Arch. f. kl. Med., Vol. CXL, Nos. 5, 6.]

Hirsch describes the symptoms resulting in a man previously healthy, with normal development, married at the age of twenty-nine, father of one child, smoked and drank freely. He was infected with syphilis at the age of thirty-three. Between forty-two and forty-four years of age he lost his beard, axillary and pubic hair and become sexually impotent. At forty-five there was distress in the region of the liver, at forty-nine frequent headaches, he grew thin and was easily exhausted. At fifty-three he suffered "nervously" with buzzing in the ears, dizziness, insomnia, general discomfort, vomiting, constipation, absence of sweat secretion, premature loss of teeth with wearing away of the crowns, atrophy of the testicles, strikingly low blood pressure, diminished adrenalin reaction, loss of strength, psychic changes, also change in the contour of the sella turcica. Autopsy confirmed the opinion that the infection had led to highgrade sclerosis of the connective tissue which had been the basis of the polyglandular insufficiency which the diagnosis recognized (hypophysis, epiphysis, thyroid, thymus, suprarenals, testicles, liver). The author describes a case of constitutional eunuchoid type which closely resembles this late eunuchoidism of the multiple sclerosis of the blood glands in its clinical picture. Although cases of that type are frequent this first case had no such constitutional background.

Engel, D. ORGANOTHERAPY OF MALIGNANT DISEASE. [Zeits. f. Krebsforsch., Feb., 1923, XIX, Nos. 5-6, J. A. M. A.]

Engel reiterates that in our research on cancer as a local affection we overlook the organism as a whole, and yet this is what determines whether malignant disease is to develop or not. He cites, for example, Rüder's report of a family in which all the seven boys developed epithelioma of the skin between the ages of five months and ten years (the grandfather had had the same disease), while the five girls in the family escaped it. Hedinger found primary carcinoma of the liver at necropsy in two sisters. A connection between the predisposition to cancer, the constitution and the endocrine system seems to be beyond question when such happenings are considered. Especially if we regard them from the standpoint of Freund and Kaminer's assertions that the serum and organs of cancer subjects do not destroy carcinoma cells as do the serum and organs of the noncancerous. They demonstrated

further that this faculty is twenty-one times more potent in the serum of infants than of adults, and they traced this to the thymus, the potency declining as the thymus retrogresses. Engel has been experimenting with the protein products of endocrine glands, Abderhalden's optones. He injected this fluid subcutaneously into mice at points remote from the experimental inoculations. His research thus throws light on the potency of the protein products of the different endocrine glands and on the influence of the different glands on tumor production and inhibition. The pituitary seems to promote tumor growth, while the thyroid, and above all the thymus, check it. The elements responsible for this action seem to be the protein products in far advanced retrograde metabolism. Testes and ovaries were found inert. Ovariectomy in inoperable cancer of the mamma is justified by the stimulation of the thymus that results.

Scaglione. THE DUCTLESS GLANDS DURING PREGNANCY. [Riv. d'Ostet. e Ginec. Prat., Oct., 1922, p. xv.]

From animal experiments Scaglione finds that during pregnancy signs of increased function of the pineal are to be found in unusual abundance of lipoid granules, of vacuolated cells, and of quasi-colloid substance in the intercellular spaces. Pineal tissue administered orally to gravid animals is without toxic effect and appears to determine an increase of fetal weight. Pineal extracts are without influence on the gravid or non-gravid uterus, modifying neither the rhythm nor the depth of the automatic contraction of the former. D. Cesare (*Ibid.*, p. xxviii), in experiments on cows, has found that the content, as measured by Antencielli's colorimetric method, of adrenaline in the adrenal gland does not show any characteristic modification during pregnancy. He concludes that any increase in the functional activity of the gland during pregnancy is confined to the cortex. By similar experiments he has failed to note more than a slight and inconstant increase in the iodine of the thyroid gland in the pregnant condition.

Blackford, Charles Minor. RECENT VIEWS OF SOME DUCTLESS GLANDS. [Virginia Medical Monthly, November, 1922.]

This article begins by saying that the results of researches into the functions of the ductless glands have been so novel and striking that there has been a great temptation to exaggerate the ascertained facts and thus to lead to disappointment and even a loss of faith on the part of many whose faith and support may be of the utmost value to science. The study of these glands and their incretions is very new, and too much must not be promised patients who seek in them relief from otherwise hopeless conditions. There are but seven of the ductless glands whose functions have been determined with any precision. These are (1) the thyroid gland, (2) the parathyroid glands, (3) the pituitary gland, (4) the pineal gland, (5) the suprarenal glands,

(6) the islands of Langerhans, and (7) the interstitial tissue of the gonads. These produce internal secretions or "incretions," which, distributed through the organism by the blood, exert important effects on more or less distant organs and tissues, and without which these organs or tissues would either cease to functionate or would functionate improperly. An outline of the clinical syndromes following an overproduction and an underproduction of the hormones elaborated by the thyroid and by the pituitary glands is given, and the effects of under and over activities on the part of the adrenals are described, as are the actions of adrenoxidase in promoting the actions of the body ferments. That chemical substances affect the development of organisms is shown by the well known fact that if fertilized fish ova be allowed to develop in sea water containing an excess of magnesium chloride, there will be produced monsters which have abandoned the hereditary habit of vertebrates since Devonian time of developing an eye on each side of the middle line and instead have developed a single cyclopean eye in the frontal bone. The development of tadpoles may be hastened or retarded by feeding them thyroid or thymus substance, and, from what we already know, we may believe that with fuller knowledge, we may ultimately eliminate mental, moral and physical degenerates, and produce a human race which will be far superior to all which have preceded it. [Author's Abstract.]

Keith, A. EVOLUTION OF HUMAN RACES IN LIGHT OF HORMONE THEORY. [Johns Hopkins Hospital Bulletin, Vol. XXXIII, No. 376, p. 195.]

In this short paper, an adjunct to his larger consideration of the development of the erect posture in human primates the author says that a study of the growth disorders reveals the fact that the hormone systems, centered in the pituitary and suprarenals, are organized on a functional basis. Hormone systems represent automatic growth mechanism which, like all living qualities, are hereditary and variable. Hormones represent the elements of an automatic system for the control of growth. For this reason new characters do not appear at the end of a development stage but early in the growth of the fetus. New characters appear first in utero; later they become fixed as a new character in the adult stage.

Correa, J., and Becco, R. ENDOCRINE BASIS OF EAR, NOSE AND THROAT AFFECTIONS. [Semena Méd., Jan. 11, 1923, I, No. 2.]

The author here applies some of the recent views of endocrinology to the study of disease of the ear, nose and throat. Thirteen cases described in which organotherapy aided in the modification of otorhinolaryngologic affections which had proved rebellious to the usual orthodox measures of external therapy. Tonsillitis which returned with the menses was arrested by ovarian treatment. In other cases, organotherapy usefully supplemented operative measures or medication to reduce congestion. One man with spasmodic rhinitis, false asthma and ethmoiditis, improved

materially under peptone and organotherapy. Measures to correct menstrual anomalies in some of the cases seemed to influence favorably deafness or recurring throat disease. The paper is suggestive even though like all such studies the analysis is very fragmentary.

Petrivalsky. PITUITARY AND OTHER ENDOCRINE GLANDS. [Zentralbl. f. Gynäk., April 22, 1922.]

An experimental study in which the response shown by dogs, before and after extirpation of the hypophysis, to mechanical and electrical excitation of the muscle of the small intestine performed after subcutaneous injection of extracts of various endocrine glands is partially analyzed. Extracts of thymus and intestine mucosa, which exerted on the intestinal musculature a well-marked spasmophilic effect lasting one or two hours, were found to exhibit diminished action in animals from which the hypophysis had been removed. In comparison with these extracts testicular and pancreatic extracts showed a less intense and less persistent spasmophilic action, which in the animals whose hypophysis had been excised was still less in the case of testicular extract, but somewhat greater in that of pancreatic extract. The spasmophilic action of thyroid extract was equally slight in normal dogs and in those whose hypophysis had been removed.

Nölle. FAMILIAL ADIPOSITAS DOLOROSA. [Zchr. f. d. ges. Neurologie und Psychiatrie, Vol. LXXVII.]

Nölle was able to determine the disease definitely in the patient and in his mother and sister. Apparently also the mother's brother and father had it.

Izumi, G. PITUITARY AND PARATHYROIDS. [Japan Medical World, Vol. II, No. 7, p. 199, J. A. M. A.]

In order to determine the function of the endocrinous glands, especially of the pituitary and parathyroid, Izumi studied the reciprocal relations between the pituitary and parathyroid, the pituitary and thyroid, the thyroid and parathyroid, and the pituitary and gonads of forty-nine cats and rats. The parathyreoprivale rats and cats showed that the chromophil cells, especially basophils, decreased remarkably in number and size in pars anterior of the pituitary; while the chromophobe cells, especially transition and mother cells, increased in number. After the removal of the parathyroid, the pituitary body of the rat, in almost every case, became smaller; while that of the cat always enlarged from two to four times the normal size. The source of this enlargement is mainly the proliferation of the cellular element of the pars intermedia. In the thyreoprivale cats, enlargement of the pituitary was the rule, caused principally by the proliferation of pars anterior, partially through the hypertrophy of the lobulus peduncularis. The pituitary of castrated rats is larger than normal due to the appearance of the castrat cells in

pars anterior. The feeding of the parathyreoprivale rats with phosphorus cod liver oil and calcium lactate had no therapeutic influence on their opaque degenerating teeth. The total or partial removal of the thyroid or total castration had no clinical effect on the course of tetany.

Peritz, G. PITUITARY ADIPOSIS IN CHILDREN. [Arch. f. Kinderh., Aug. 26, 1922, LXXI, No. 4.]

Peritz describes the metabolic findings in several cases of hypophyseal adiposis in older children, nearly all with inherited syphilis. In two cases in which hydrocephalus seemed to be a factor, the stunted growth was modified by pituitary treatment, one youth of 18 growing 15.5 cm. taller in three years. The growth seemed to stop when the pituitary treatment was suspended. There was no change in the adiposis or dysgenitalism.

Witthauer, W. HYPOPHYSEAL DWARFISM. [Zschr. f. d. ges. Neurologie und Psychiatrie, Vol. LXXVII.]

Witthauer reports in detail a case of dwarfism, male, twenty-four years, height 136 cm. Roentgen ray examination together with careful functional tests revealed a tumor or cyst of the hypophysis which chiefly affected the right eye. The peculiar result was failure of function in the temporal left half of the retina. The commissures of the epiphysis were intact. There was hypogenitalism.

Knoll, W. PITUITARY CACHEXIA. [Wien. Arch. f. inn. Med., July 25, 1922, IV, Nos. 2-3.]

The relationship of the pituitary to the blood pigments, if any, is complex. This study of nineteen cases, twelve of whom were women, seeks some light on the question. In one case the condition in a young man was masked by tuberculosis. The triad of symptoms, premature senility, falling of the hair and decline of genital function, with corresponding mental decline is emphasized. Embolism of an artery in the anterior lobe of the pituitary seems to be the primary factor. A tuberculous process in the pituitary, more frequent than is suspected, may be responsible.

Desogus, V. PITUITARY GLAND IN CEREBRAL LESIONS. [Schweiz. Arch. f. Neur. u. Psych., 1922, XI, No. 2.]

An experimental study in which the influence of cerebral trauma on the pituitary gland in dogs is studied. In fifty dogs he destroyed in some both occipital lobes, in others the parietal or frontal lobes of the brain. He found hyperemia and hypersecretion of colloid and a strong eosinophilia from twenty to thirty days after the operations. Between thirty and sixty days a regression takes place which reaches its maximum during the next month. The pituitary becomes normal after three months.

II. SENSORI-MOTOR NEUROLOGY.

1. CRANIAL NERVES.

Nicolás, Felisa. BILATERAL OPTIC ATROPHY ASSOCIATED WITH CERTAIN MENINGITIC SYMPTOMS; REPORT OF A CASE. [Journ. of the Philippine Islands Med. Assoc., Vol. II, March-April, 1922, No. 2.]

The patient is a Filipino boy, about thirteen years old, brought to the Philippine General Hospital November 28, 1921, conscious, but with a dull facial expression. There was complete loss of vision in both eyes and the voice aphonic. Child was emaciated, feverish (37.50 C on admission), and unable to stand up. Bowels rather constipated. Urination free, but only two or three times during the day. Appetite good. When undisturbed he apparently fell asleep but could be aroused easily. No hyperesthesia observed. The patient is said to have been sick two months before admission, with moderate fever that lasted for about a month. He was then complaining of headache, intense and persistent, which disturbed even sleep. About two or three weeks before admission, a swelling developed in the left upper lid causing severe inflammation of the eye. A scratch with a pin was made on its surface and much pus is said to have been evacuated. Later on vision became gradually weak until totally lost. About ten days before admission voice became impaired and reduced to whisper. Patient gradually lost weight and became very weak, but appetite remained good. No history of convulsion or of having lost consciousness.

Physical Examination: Marked rigidity of the neck. Cervical glands not palpable. No paralysis of the extremities. Knee reflex absent. Kernig's sign very marked, especially in the left lower extremity. Heart O. K. Pulse good. Except for a slight impairment of resonance at the apices no other abnormal signs could be elicited in the lungs. No aural discharge present. Hearing apparently normal. Tonsils not enlarged. Laryngoscopic examination: paresis of the left vocal cord.

Eyes: Left upper lid swollen, presenting a fresh scar which appeared to be distended with some fluid. At one end of this scar there was a small fistula through which a thin seropurulent discharge exuded. Exploring this fistula with a probe it was found that even the upper margin of the orbit was involved. This scar is about an inch long and runs almost parallel and just below the eyebrow. The left eyeball is distinctly at a lower level than the right, protrudes slightly but not tender. The left eyeball could not be elevated. Pupils dilated and immobile. Vision entirely negative. Fundus examination showed signs of optic atrophy in both eyes. No tubercles seen.

Laboratory findings: Urine, negative; blood, 10,200 leucocytes with predominance of polynuclear neutrophiles, Red cell count, 3,020,000. X-ray showed dense areas throughout both lungs, suggestive of P.T.B.

X-ray of head showed enlarged sella turcica. Lumbar puncture performed twice. The first time about 20 c.c. of slightly turbid fluid obtained under moderate pressure. Cytological exam: 6 leucocytes per c.mm. and no tubercle bacilli found in the sediment. Three days later another lumbar puncture was made and only about 3 c.c. of fluid could be obtained. First portion of this mixed with blood. Leucocytes and differential counts gave the following results: 20 per c.mm., with preponderance of polynuclear neutrophiles. Negative for globulin and T.B. bacilli. There were many red blood cells. Widal reaction negative. Sputum, negative for T.B. Wassermann reaction negative, both in blood and in cerebrospinal fluid. The extension of the lesion in the left upper lid was again explored and for this purpose a probe was passed into the fistulous opening which was then enlarged, and X-ray requested. Report: Enlarged sella turcica with destruction of the posterior wall. Probe passed through anterior wall of the frontal sinus. The eye lesion, the history of fever and headache, and the few physical signs elicited led us to suspect that some intracranial lesion was responsible for all these manifestations. [Author's abstract.]

Dandy, W. E. PRECHIASMAL INTRACRANIAL TUMOR OF THE OPTIC NERVES. [American Journal of Ophthalmology, March, 1922.]

Two cases of tumor of the optic nerve between the optic foramen and the chiasma are reported in this surgical paper. The diagnosis is difficult owing to the absence of characteristic symptoms; there is no proptosis, no hemianopsia, no X-ray appearance of erosion of the *sella turcica*, no optic neuritis, but only failing vision and atrophic discs. The first patient was a girl, aged thirteen years. Since her seventh year she had had several vomiting attacks, with diplopia and failing sight. On examination the right eye was found to be totally blind and the left vision $\frac{8}{200}$ dioptre. The discs were atrophic. Despite the absence of headache, the transient bilateral extraocular palsies accompanying the spells of vomiting and the slow, progressive blindness seemed to indicate a tumor. Only a pineal tumor or one in the region of the sphenoidal fissure could produce bilateral ptosis and extraocular palsies. The pineal region was excluded by the absence of optic neuritis and high intracranial pressure. At the operation two independent tumors were found surrounding each optic nerve at the foramen, 1.5 centimeters in diameter, and extending into the orbit for about 1.5 centimeters. The tumors were endotheliomata arising from the dural sheath, with features of a psammoma. The growth on the right optic nerve was totally removed, including the orbital portion, through a resection of the orbital roof. The left tumor could be only partially removed, but vision was restored to $\frac{20}{200}$ dioptre. The second patient was a boy of eight years, blind in the right eye with $\frac{20}{200}$ dioptre vision in the left. Both discs were pale. No headache, vomiting or palsies were present. A right craniotomy over the

frontal region was performed. The right optic nerve was normal as far as could be seen, but a tumor the size of a cherry was found beneath the left optic nerve, which was also constricted by a tight band of fibrous tissue between the anterior clinoid process and the optic foramen. This band was excised, but the tumor was too far distant for removal. The tumor did not seem to enter the optic foramen. The result was a distinct improvement in the sight of the left eye to $^{20}/_{20}$ dioptré and to $^{80}/_{70}$ dioptré in the right. Many intraorbital tumors extend into the cranial chamber; orbital operation does not therefore meet the case. When such an extension exists, only an introcranial operation can save life or vision.

2. PERIPHERAL NERVES.

Haglund, P. SCIATIC SCLIOSIS. [Act. Med. Scand., 1922, LVI, No. 6; J. A. M. A.]

Haglund's orthopedic experience has confirmed the assumption that sciatica, lumbago and often pains in the back may be the result of irritation or strain, usually from some upset in the static balance of the body or overexertion. The result is a neuralgia, and measures to relieve the irritation or strain may cure rebellious pain as if by magic. While orthopedists are familiar with such experiences, this is an unexplored field for internists. The term sciatic scoliosis is misleading; the spine is bent merely to relieve the sciatica. It is a compensating attitude with no settled curvature at first. Four cases are described showing extreme types. In the first, the man of forty-five had been long incapacitated with intense pain in the right leg and the back, together or alternately, and the trunk was bent far over to the left. Progressive correction with plaster jackets restored health and earning capacity. In the second case the supposed sciatica in the right leg of the boy of fourteen had been unbearable for months except when he bent the spine far forward. Any attempt to stand straight caused excruciating pain. With progressive plaster bandages to the trunk and hip joint, a complete cure was realized in a few months. In all these cases no organic anomaly could be discovered with roentgenoscopy. He theorizes to explain the benefit from the gradual plaster correction, and declares that the same principle can be applied to many other groups of similar combinations of symptoms in other regions. He exclaims, "That our diagnostic rubbish heaps—sciatica, rheumatism, lumbago, etc.—those disagreeable signs of our fearful ignorance—become reduced more and more must be a cause of great satisfaction to us." He fully endorses Lindstedt's theory of these pains as an irradiating neuralgia from irritation or strain, and advises prolonged reclining, to relieve the strain on spine and hip joint. If this fails, then progressive plaster fixation of the spine should be considered. Even if the patient is neurasthenic, this is no reason for not trying to remove the cause of the

trouble. "In this respect we have sinned much and are still sinning against these patients." The article is in English.

Navarro, A. NERVES IN FRACTURE OF THE WRIST. [An. d. l. Fac. d. Med. d. Montevideo, September-October, 1922, VII, Nos. 7-8.]

In one of Navarro's two cases the nervous disturbances developed slowly but were pronounced by the third month. The fracture had been treated without immobilization, and secondary deformity, with compression of the median nerve, resulted.

McGuire, E. R., and Burden, J. F. UNUSUAL CASE OF SARCOMA OF THE MEDIAN NERVE. [Surg. Gynec. & Obst., 1922, 453; Med. Sc.]

McGuire and Burden's case was that of a woman of forty, who for the preceding five years had been aware of the presence of a small painless mass on the anterior aspect of the right forearm. Five weeks before admission to hospital, an increasing swelling of the forearm in the region of the mass had occurred, associated with severe pain in the forearm and hand. The authors state that "there was slight diminution of function over distribution of medial nerve, but not sufficient to be noticed by the patient." Operation revealed an elongated mass apparently connected with the median nerve. Nine inches of the nerve together with the mass were resected. Subsequent examination showed it to be 15 cm. in length by 4.5 cm. in diameter. It was firm in consistence and pinkish in color, and appeared to have invaded the sheath of the nerve. Microscopic examination gave a typical picture of neurofibroma at the distal pole, but at higher levels rapidly growing fusiform cells and cells of irregular outline showing mitotic figures were seen, also giant cells and numerous dilated capillaries. The nerve-fiber bundles were separated by growth and were atrophic. The diagnosis of spindle-celled sarcoma originating in a neurofibroma was made. Recurrence at the seat of operation occurred within a few weeks and amputation above the elbow was performed. Previously, radium and X-ray treatment had been tried without benefit. Neurosarcoma appears to be of rare occurrence, and the authors could find only two similar cases in the literature of the past few years. These are briefly described. [F. M. R. Walshe.]

Stopford, John S. B. A NEW CONCEPTION OF THE ELEMENTS OF SENSATION. [Brain, Vol. XLV, Parts 3 and 4.]

This paper consists of an investigation of what has been described as "deep sensibility," i.e., the sensation dependent upon afferent fibres which terminate in the subcutaneous tissues.

At the outset attention is drawn to the fact that by subdividing sensation into cutaneous (epicritic and protopathic) and deep we are confronted with certain anatomical and clinical difficulties, which are most evident in the hand and digits where most of the experimental work upon this subject has been performed. It is pointed out that it is impos-

sible to separate anatomically the fibres distributed to cutaneous and subcutaneous structures of any sensory nerve of sufficient size to warrant its use as a source of information about sensation. Evidence is submitted to show that the radial nerve besides supplying skin is usually distributed to certain articular structures. Clinical difficulties in determining whether the sensory fibres of a nerve were distributed solely to skin or not are mentioned, the chief hindrance arising from the fact that it was impracticable to ascertain for certain whether some aspects of sensation were subserved by fibres terminating in skin, or subcutaneous tissues, or both. In the case of localization it is clear that fibres subserving this form of sensibility terminate cutaneously and subcutaneously.

Since no nerve trunk or branch, of sufficient size to receive a name, has an exclusively cutaneous distribution it is not accurate to regard deep sensibility as the residual sensation after division of such a nerve as the radial. It appears that the designation by anatomists of nerves as "purely" cutaneous on insufficient evidence has misled some previous workers and brought about an artificial division of sensation into cutaneous and deep. Subcutaneous tissues are innervated by branches of cutaneous nerves (as the digital branches of the median, ulnar or radial) as well as by afferent fibres which run with the muscular branches and descend along the long tendons to their termination, instead of solely by the latter as has been suggested by Head and his co-workers.

Results of experiments are submitted to show that the various forms of sensation included under the term deep sensibility may be dissociated. For example, after division of the median at the wrist there is found a loss of the recognition of passive movements at the metacarpophalangeal and interphalangeal joints of the digits supplied by the nerve: some power of localization is retained, although by means of a measurable test a gross error is seen on comparing the results with those obtained on the normal part; the least pressure is readily appreciated everywhere, and the readings with an algometer show that rather less pressure is required to induce pain on the affected than on the sound side.

Observations upon the recovery of deep sensibility after suture of a peripheral nerve demonstrate several striking and significant features. Reappearance of the recognition of contact and the appreciation of pain on the application of excessive pressure occurs early, as a rule during the stage of protopathic recovery. As the recognition of contact and pressure pain improve there is usually a return of some power of localization, but it is very grossly defective, the error being greater in regions where there has previously been an absolute sensory loss than elsewhere. Further improvement in localization and the recognition of the passive movement of joints occurs very late, and not until there is evidence of recovery of epicritic sensibility. The observations upon recovery of certain forms of sensation suggest two conclusions:

(a) What has been regarded in the past as deep sensibility ought to

be subdivided, just as cutaneous sensation has been divided into epicritic and protopathic.

(b) In the light of Head's recent work upon the sensory cortex it appears that at the periphery, both in cutaneous and deep tissues, we have cortical and thalamic aspects of sensation. It has been believed that the earlier return of protopathic sensation is dependent upon a more rapid rate of regeneration in protopathic than epicritic fibres. A simpler explanation occurs when we take into consideration all the forms of sensation which return during the later stage of recovery. The forms appearing late, and which more frequently show imperfect recovery, are those which Head has proved to have cortical representation; whilst the forms which exhibit early and more perfect recovery are those which may be expected to persist after destruction of the sensory cortex. Therefore it seems more reasonable to expect to find an explanation of the two stages of recovery in the central nervous system, rather than to find it due to a different rate of regeneration of two sets of fibres which anatomically appear identical. After suture and regeneration of a peripheral nerve a much longer period may be expected to elapse before the fibres subserving cortical aspects of sensation function correctly, than in the case of fibres conducting the thalamic aspects of sensation; since a very much more complex readjustment and reëducation must occur after regeneration of the fibres in the former case than in the latter. [Author's abstract.]

3. SPINAL CORD.

Rudolf, G. de M. THE PHYLOGENETIC SIGNIFICANCE OF THE PLANTAR RESPONSE IN MAN. [J. Neurol. & Psychopathol., 1922, XI, 337, Med. Sc.]

With the object of determining the fundamental principles governing the form of the plantar response in man, this has been investigated in infants during the first two weeks of life, and also in a variety of animals ranging from newts to apes. Among the lower classes of animals, with few exceptions, no plantar response was obtained. The smaller mammals gave a plantar flexor response, if any, but the monkeys all gave an extensor (dorsiflexor) response. The author concludes that among animals the extensor response is characteristic of the primates. In infants he finds that during the first week of life a flexor plantar response is often present. This subsequently gives place to an extensor response. The type of flexor response seen corresponds to that which may usher in the return of reflex activity after total transection of the cord in adult man. Here, as in the infant, a dorsiflexor or extensor response soon replaced the initial flexor plantar response. Rudolf therefore concludes that the most primitive plantar response is flexor in type, and that this gives place, both ontogenetically and phylogenetically to an extensor type of response. Finally, in man, the extensor response is again modi-

fied under cortical influence into the normal plantar response of flexor type during infancy. This final conversion is found in man alone. He finds no reason to reject the commonly held view that the extensor plantar response of infancy and of spinal man is of the nature of an atavistic reversion to the type of response characteristic of our arboreal ancestors, but no reasons are given for accepting the disputed and purely speculative notion that man derives from arboreal ancestors. [F. M. R. Walshe.]

D'Antona, S. THE PATHS FOR PAIN AND TEMPERATURE SENSIBILITY. [Riv. d. patol. nerv., 1922, XXVII, 934, Med. Sc.]

Clinical and histopathological observations, the results of which are summarized by the author as follows: The sensory path for heat and pain consists of a chain of four neurons. The first goes from the body-surface to the cells of the dorsal horn of the spinal cord. The fibers of the second arise from the cells of the dorsal horn and intermediolateral column; after crossing to the opposite side they mix with the fibers of the anterolateral ascending tract. A small number of the fibers of this second neuron continue uninterruptedly as far as the "ventral nucleus" of the optic thalamus (spinothalamic bundle), but most of them end in the medulla oblongata round cells of the grey reticular formation and superior portions of the nuclei of Goll and Burdach (spinobulbar fibers). The fibers of the third neuron arise from the groups of cells just mentioned, but their exact course is not known; very likely they unite with the principal sensory path and reach with it the optic thalamus. The fourth neuron consists of fibers arising from cells of the ventral nucleus of the optic thalamus. Part of them end in the "essential nucleus" of the thalamus, part continue their ascending course and reach the cerebral cortex. [C. da Fano.]

Laroche, G. COLLOID REACTIONS OF THE CEREBROSPINAL FLUID. [Bulletin Médical, Vol. XXXVI, No. 24, p. 530.]

The colloidal benzoin test, in the author's opinion, is instructive in various forms of neurosyphilis. In paresis the benzoin reaction is very pronounced, as also often in tabes. In clinically progressing forms of cerebrospinal syphilis, the colloidal benzoin reaction is positive. When progressing syphilitic lesions have disappeared and only sequelae remain, such as hemiplegia, paralysis, etc., the colloidal benzoin reaction is often negative. In secondary syphilis, the benzoin reaction is positive only in patients having pronounced hyperalbuminosis and hypercytosis, with positive Wassermann reaction. The reaction is negative in patients with lesions of the nervous system of nonsyphilitic origin. It is always negative in epidemic encephalitis while the Wassermann reaction may be positive. Comparing the Wassermann reaction and the colloidal benzoin reaction in neurosyphilis, one may be positive while the other is negative, and vice versa. Cases exist in which a positive colloidal benzoin reaction

alone leads toward a diagnosis of neurosyphilis, confirmed later by the evolution of the disease, and the Wasserman test becoming positive after reactivation with arsenical or mercurial treatment. It is also of real prognostic value, and can give important data on the gravity of clinical cases. It is simple and accurate and should be used in conjunction with the Wasserman reaction, and will give valuable information on the acute and subacute evolution of syphilitic lesions. Laroche describes his technic in detail, and extols the advantages of this colloidal benzoin method over the Lange, Emanuel and other tests.

Pophal, H. VINDICATION OF THE REFLEX NATURE OF THE TENDON PHENOMENA. [D. Zschr. f. Nervenhlk. Vol. LXXIV, Nos. 5, 6.]

Pophal contends that the clinical and experimental evidence is sufficiently abundant to offset the opinion of Frank that the tendon reflex phenomena are merely individual idiomuscular spasms depending upon the autonomic tonus of the sarcoplasm. Pophal reports experiments of his own to support the correctness of accepting the reflex nature of the tendon phenomena. He severed the three sacral and seven lumbar roots from below upward on the left side in a dog. The results were flaccid paralysis of the right hind leg and partial paralysis of the left, complete loss of the left patellar reflex and marked diminution of the right. Curarized rabbits showed beside motor paralysis complete loss of the tendon reflexes.

Weed, L. H. ABSORPTION OF CEREBROSPINAL FLUID INTO VENOUS SYSTEM. [Am. Jl. of Anal. January, 1923, XXXI, No. 3, J. A. M. A.]

The pathway of absorption of the cerebrospinal fluid into the blood stream under normal conditions is by way of arachnoid villi into the great dural venous sinuses. Under the influence of an increased salt content of the blood, produced by the intravenous injection of strongly hypertonic solutions, Weed asserts that absorption takes place also by way of the perivascular channels and through the ependymal lining of the cerebral ventricles into the capillary bed of the nervous system. In the normal process, filtration may be the physical factor of greatest importance, but after the intravenous injection of strongly hypertonic solutions, osmosis and diffusion apparently play the only active rôles.

Golla, F., and Hettwer, J. THE INFLUENCE OF VARIOUS CONDITIONS ON THE TIME RELATIONS OF TENDON REFLEXES IN THE HUMAN SUBJECT. [Proc. Roy. Soc. B., 1922, XCIV, No. 92, Med. Sc.]

The knee-jerk was the reflex chosen for investigation. Uniformity of stimulus was obtained by electrically released pendulums, and the response was recorded electromyographically by means of the string galvanometer. In these circumstances, the authors find that the magnitude of the response is influenced by the strength of the stimulus and

by certain psychical and physical factors in the subject which lead to an increased tone in the reacting quadriceps (cf. *Medical Science*, 1922, VI, 41). The latent period of the response varies inversely with the strength of the stimulus, and undergoes the most marked shortening when rhythmically repeated stimuli are employed. There is a refractory period, independent of the strength of stimulus evoking the jerk which gives rise to it, but varying inversely with the strength of stimulus used to determine it. They regard the knee-jerk as an "all-or-none" response for each single neurone concerned in it. The muscles antagonistic to quadriceps enter into contraction 10 sigma (1/100 sec.) later than quadriceps. This contraction of antagonists forms part of the spinal reflex pattern elicited by tendon stimulation. [F. M. R. Walshe.]

4. MIDBRAIN, CEREBELLUM.

Lossius, I. TUMOR IN CEREBELLOPONTILE ANGLE. [Norsk. Mag. f. Laeg., January, 1923, LXXXIV, No. 1.]

In this case report in addition to the type symptoms there were a few anomalies and furthermore the optic discs seemed to be normal. The tumor was removed at one sitting.

Stenvers, H. W. TUBERCLE IN THE TEGMENTUM OF THE PONS. [Ned. Tijdschr. v. Geneeskunde, 1922, p. 2044. Also Schweizer Arch. f. Neur. u. Psych., Vol. XI, H. 2, p. 221.]

The author describes the clinical and anatomical examination of the above-mentioned case. The tubercle in the tegmentum of the pons is situated frontalwards between the foremost part of the nucleus of the nervous abducens caudalwards; it reaches halfway the nucleus olivarius interior. The fasciculus longitudinalis posterior and the fasciculus prædorsalis are destroyed.

Comparing the clinical picture with the anatomical results, it is evident that the tubercle has developed from a center in the middle part towards the pons and the cord. The first symptoms were disturbances of the ejaculation, then he had hiccoughing, afterwards gustatorial feelings, giddiness and paresis of the tongue, vomiting and seeing double.

The patient himself had observed, eight months before death, that he had erections but no ejaculations. This dissociation evidently is not only a symptom of the myelum but also of the higher parts of the central nervous system. For the ejaculation also the medulla oblongata is necessary. For the erection only the myelum is sufficient (other observations of the author).

Four and one-half months before death the hiccoughing began. With regard to the production of an acid fluid in the stomach at the same time, the hiccoughing was thought to depend on an influence of the nuclei of the nervi vagi.

Three weeks before the admission to the clinic the patient could not swallow when he thought of it when doing it. When he did not think of it, he could. There were many symptoms in the whole complex, which are used to be considered as hysterical. This case shows that many so-called hysterical complaints can have an organic base.

Before the admission to the clinic the patient had also complained of a so-called giddiness, when he met a person on the street. What he meant with this giddiness is not so easy to understand but as a matter of fact we can say, that an optical impression of a moving object disturbed his orientation in the room. It is very probable in our case that the destruction of the central connections between the nuclei N. vestibularis as the nuclei of the eye muscles and the more central parts of the nervous system is the cause of this complaint. The disorientations became very evident some days before death, when the patient was delirious. In this less clear state of mind, when all stimulations enter the central nervous system uncontrolled, the trouble of the room-orientation was very great. The clinical picture resembled that published by Pick in the *Zeitschrift f. d. ges. N. und Ps. Bd. 56, 1920, p. 213*, in which the patient also thinks that the walls of the room fall upon him, that they are not placed perpendicular and that they move upwards, and so on. [Author's abstract.]

Arden-Delteil, et al. HEMIBULBAR RETRO-OLIVARY SYNDROME. [Bull. d. l. Soc. Med. des Hôp., November 17, 1922, XLVI, No. 32.]
This syndrome resulted from a syphilitic infiltration.

Hunt, J. R. STRIOCEREBELLAR TREMOR. [Arch. of Neur. & Psych., December, 1922, VIII, No. 6.]

The existence of a combined form of tremor caused by the involvement of separate neural mechanisms is well known. Those chiefly recognized are combined forms of palsy, central and peripheral, pallidal and pyramidal, as well as combined forms of sensory disturbances due to simultaneous involvement of more than one system. Striocerebellar tremor is an illustration of such a combination as here described.

Griffith, J. P. C. ACUTE CEREBELLAR ATAXIA. [Am. Jl. of Med. Sc., December, 1921.]

The literature on acute cerebellar ataxia is here reviewed. Thirty-one examples of the condition are utilized which are all the author has been able to find in the literature. The onset was acute in every instance and occurred at an early age (a few months to ten years). The attack nearly always followed an acute infection, particularly measles. The first symptoms were generally unconsciousness and absence of speech lasting a few days. Subsequently the mentality appeared to be not quite normal; there was imperfect enunciation, with ataxia of the limbs, head or trunk, staggering gait or inability to walk. Convalescence was slow and recovery

eventually fairly complete, except for some psychic symptoms. Nystagmus occurred in the case of ten patients, strabismus in five. The reflexes were usually normal. Only two autopsies were obtained. There was atrophy of the cerebellum in each instance. The possible relationship of this condition to epidemic encephalitis is interesting. The author considers it to be an example of cerebellar encephalitis.

8. NEUROSYPHILIS.

Marie, A., and Fourcade. TREATMENT OF NERVOUS SYPHILIS BY THE TARTRIO-BISMUTHATE OF SODIUM AND POTASSIUM. [Arch. Internat. de Neurol., Feb. 1922, XLI, p. 58.]

Very encouraging results have followed on Sazerac and Levaditi's treatment of primary, secondary, and tertiary syphilis by various salts of bismuth, notably the tartro-bismuthate of sodium and potassium in oily solution. The writers have tried this salt in twenty cases of nervous syphilis: ten of these were general paralysis in a far advanced stage; the other ten comprises gummata, arteritis, transverse myelitis, demential and delirious states, etc., all dependent on syphilis. In all these the Wassermann reaction was positive. The technique followed was this: intramuscular injection of half an ampoule every five days, up to twenty injections; this represented about 3 grams of the salt for each patient. No serious complications followed. Real benefit seemed to occur in delirious dementia; the delirious ideas diminished, also the hemiparesis in one case, and there was intellectual improvement. In a case of simple dementia there was physical improvement (in the paraplegia which was present). In no case was the Wassermann reaction in the cerebrospinal fluid influenced. Gummata of the central nervous system, arterites and certain neurites were rapidly benefited. But at present bismuth has not done any good in cases of diffuse perimeningo-encephalitis. The writers think it should be tried in the pre-paralytic stage and in tabes "ascendens," *i.e.*, as a prophylactic remedy. However, they advise a prolonged trial of bismuth salts in a larger number of cases. (This is the first recorded attempt or treatment by bismuth salts in nervous syphilis.) [Leonard J. Kidd, London, England.]

Schaller, W. F., and Mehrrens, H. G. THERAPY IN NEUROSYPHILIS. [Am. Arch. of Neur. and Psych., Jan. 1922, VII, No. 1; J. A. M. A.]

Intravenous and intramuscular therapy caused symptomatic improvement in the majority of cases treated by Schaller and Mehrrens. Serologically only 19 per cent cleared up entirely. It was more efficacious in the meningeal, vasculomeningeal and diffuse types. Intraspinal medication was superior to the intravenous and intramuscular methods in its effectiveness in clearing up the spinal fluid. Forty-eight per cent of the cases became clear through the use of the intraspinal methods as com-

pared to 19 per cent following the intravenous method. The most useful field for intraspinal therapy is that of the meningoparenchymatous types, including tabes. However, patients with optic atrophy and with tabes without meningeal reaction received no benefit. Patients with parenchymatous lesions (including paresis) did poorly, but 25 per cent of the cases thus treated cleared up clinically and serologically. A remission, at least, was effected. Massive rectal injections of neoarsphenamin (4 gm.) may be substituted profitably for arsphenamin given intravenously in intradural medication when intravenous injection is impracticable. In the treatment of the individual case of neurosyphilis, it would, therefore, seem proper to begin with intensive intravenous and intramuscular medication, particularly in vascular, meningovascular and diffuse lesions. Failure to reduce spinal fluid findings to negative after a thorough trial should suggest the advisability of using more intensive methods. Drainage, combined with intravenous injections, again should be the procedure of choice when facilities for more complicated methods are lacking or when symptoms of increased spinal fluid pressure are distressing. The Swift-Ellis, Ogilvie or Byrnes method should be reserved for cases resistant to the foregoing efforts. These resistant cases will be found particularly in tabetic patients. Patients with optic atrophy and neurosyphilis without cerebrospinal fluid reaction receive no advantage from intraspinal medication. Patients with inadequate veins can profitably receive the arsenic in the form of massive rectal injections of neoarsphenamin.

Solomon, H. C. TREATMENT OF NEUROSYPHILIS. [Penn. Med. Jour. January, 1922, XXV, 236.]

The author attempts to show from the experience of the neurologist that there is no adequate routine method for the treatment of early syphilis which will prevent the development of central nervous system involvement and if this is so for early syphilis it is even more true that no one method can be devised that will give satisfactory results for the treatment of neurosyphilis. There are case reports presented showing the successes and failures of certain types of treatment and in some cases showing that a change of method may give results. The following conclusions are given by the author:

1. Neurosyphilis frequently develops during the course of the usual routine antisyphilitic treatment, which must then be considered inefficient.
2. More intensive general treatment may be quite efficient in such cases.
3. There are cases which do not seem to respond to general treatment, given in amounts approaching the patient's tolerance.
4. Some of these cases will react very favorably when given intraspinal treatment.

5. Again there are cases which do badly under a combination of general and intraspinal treatment.

6. Some of these cases may do well when given intraventricular injections.

7. It does not follow that any one method is supreme for all cases but merely the best for a given case.

8. Thus mercury and iodides may succeed when arsphenamine fails.

9. There are cases (notably general paresis) where the combination of our present methods is not efficient.

10. The spinal fluid is not the major criterion of success or failure, as patients whose fluids remain pathological may recover clinically, whereas patients whose fluids become negative may succumb from neurosyphilis.

11. Treatment as ordinarily given is far below the patient's tolerance; the frequency with which intravenous arsphenamine and intraspinal injections may be safely given is rarely reached. (Author's abstract.)

Hanssen. TREATMENT OF CEREBROSPINAL SYPHILIS. [Acta Medica Scandinavica, Jan. 1921.]

In Bergen, in 1917 and 1918, among 2,464 patients tested by this author, Wassermann's reaction was carried out in 440 cases, and was found to be positive in 96. In 53 of these 96 cases cerebrospinal syphilis was diagnosed, tabes and general paralysis being included in this category. The author gives the three following possible explanations for this high rate of cerebrospinal syphilis: (1) In 1898, there were extraordinarily many cases of syphilitic infection. The cerebrospinal syphilis two decades later may be the sequel to this crop of infections. (2) Cerebrospinal localization of syphilis may have been promoted by salvarsan treatment. (3) Bergen being one of the busiest ports in Europe during the war, the number of sailors among the syphilitic was very high, and in this class the incidence of cerebrospinal syphilis is remarkably great. Thus 25 per cent of the sailors admitted to an asylum in Bergen suffered from general paralysis, whereas of the total number of lunatics admitted in a ten-year period only 3 per cent suffered from general paralysis. The author advocates supplementing salvarsan treatment with mercury and potassium iodide. The intrathecal administration of neosalvarsan has been of no value in his experience.

Fordyce. TREATMENT OF NEUROSYPHILIS. [Am. Jour. Med. Sci., March 1921.]

A prolonged study of early cases of neurosyphilis as regards the therapeutic response of the fluid changes to treatment has convinced For-

dyce that, on the one hand, superficial types are rapidly curable, and, on the other, deeper ones yield only to prolonged treatment. In their therapeutic response and fluid formulas the latter are probably of the preparetic type which without treatment would eventually result in degenerative encephalitis. A definite and constructive plan for the prophylaxis of the degenerative stage of syphilis of the central nervous system and its treatment in the initial stages can only be devised by a study of the infection in its inception. Syphilis of the nervous system probably begins in the first year of the infection. Early neurosyphilis may manifest itself by obtrusive symptoms, by slight objective or asymptomatic signs. Treatment by the usual channels may control the obtrusive symptoms. It seldom cures the underlying infection. Symptoms, at times, develop during or shortly after intensive courses of arsphenamin and mercury. If not cured these early infections may persist and cause late neurosyphilis. No case of syphilis should be discharged without the knowledge gained by examination of the spinal fluid. In case no evidence of infection is found, a prognosis of probable future immunity may be made. If infection exists, it should be treated by methods shown by experience to be effective. Fordyce is convinced by an experience of seven years in the use of intraspinal therapy that practically all cases of early neurosyphilis can be cured more rapidly, and in the majority of cases cured only by the combined intravenous and intraspinal method. [J. A. M. A.]

III. SYMBOLIC NEUROLOGY.

1. PSYCHONEUROSES.

Hellwig, A. PSYCHOLOGY OF OCCULTISM. [Münch. med. Woch., June 27, 1924.]

Schrenck-Notzing's latest work is here examined. Hellwig finds that the book brings no convincing proofs but contains excellent material on the inadequacy of human observation. Telekinesis in a cage surrounded by gauze failed completely according to the records. Yet one of the critics regarded the experiment as a success. Finger-prints in a dish containing clay, situated at the right side of the medium, and traces of clay found on the fingers of his left hand did not arouse the slightest suspicion among the poetic and scientific observers present.

McDougall, Wm. THE NATURE OF FUNCTIONAL DISEASE. [Presidential address to the American Psychiatric Association, 1921.] [American Journal of Psychiatry, Vol. I, No. 3, January, 1922.]

McDougall pays a tribute to the advances of science, particularly of medical and mental science. He considers the problem of structure versus function. He points out that whatever we may think of the importance of the structural defect theory of mental disease "it must be admitted that during the latter part of the nineteenth century, when this

theory and practice held almost exclusive sway and when other branches of science were making very rapid progress, advance of the theory and practice of psychiatry was disappointingly slow." The psychological study of the patients was totally neglected. Then there developed the organic neurologist group and the organic psychiatrist group, while the neuroses were "neglected by all with a few distinguished exceptions such as Morton Prince in this country and Pierre Janet in France." This, he said, was entirely changed by the war and the work of the *psychoanalysts*, "whatever opinion one may hold of their doctrines."

McDougall then attempts to present a philosophical conception of the relation of functional disease to mechanistic theories of structure, and illustrates it by comparing the neuroses to an automobile with a carburetor functioning badly because of cold weather or some other environmental change demanding an adjustment beyond the organism's power of self-regulation.

He classifies the attitude of psychiatrists toward psychogeneses of psychoses into the pros, the cons, and the uncertain, and places Kraepelin in the latter group. Jung and Mott, he thinks, represent the pro and con attitude, respectively, or at least did, he says, "until this very morning," when he received a publication from Dr. Mott in which he "seems to embrace the functional theory." McDougall himself comes out flatfooted in favor of psychogenic origin of some mental diseases, distinguishing three possibilities: (1) Diseases which, though involving structural and chemical abnormalities, are of functional origin. (2) Diseases which are of functional origin and of functional essence, involving no particular pathological tissue change, but only a disturbance of the quantitative balance of functions. (3) Mental diseases which are of the mind only and not at all of the body. [Menninger.]

à Court, A. H. FUNCTIONAL PARALYSIS. [Med. Jl. Australia, May 10, 1924.]

This is a case of functional disability engrafted on a basis of organic disease. After a bed-ridden existence extending over a period of ten years, a few weeks in hospital enabled the patient to recover the power of walking and altered her condition very markedly.

Tilney, F., and Casamajor, L. MYELINOGENY APPLIED TO STUDY OF BEHAVIOR. [Am. Arch. Neur. & Psych., July, 1924.]

This beautiful piece of work demonstrates in a most thorough manner the structural components in behavioristic reactions. They are studied by Flechsig's method. The research is monumental.

Hellwig, A. CLAIRVOYANTS IN CRIMINAL CASES. [Med. Klin., June 22, 1924.]

This observer, director of a court in Potsdam, has become convinced that clairvoyants for criminal investigations is a bit of humbug.

Eisler, M. J. TRAUMATIC HYSTERIA WITH UNCONSCIOUS PREGNANCY
PHANTASY. [Int. J. *Psa.*, II, Part 4.]

The author subtitles this paper *A Clinical Contribution to Anal-erotism*. Translated from *Int. Zeit. f. Psa.* Prefacing his remarks by reverting to Freud's 1908 generalizations concerning Character and Anal-erotism, Eisler calls attention to the difficulties in the elucidation of this important topic which have been encountered since this early presentation. Notwithstanding these, the past fifteen years has seen an increasing presentation of the many subtle ramifications growing out of this primary constellation. Still many phases are lacking, and the author would emphasize one, namely, detailed presentations of the circumstances of anal-erotism. With this in view, he describes his own case of a severe neurosis erected upon a fixation of anal-erotic components. The analysis occupied at least seven months and, from the therapeutic point of view, was satisfactory. A thirty-seven-year-old tramway employee fell from a car while in motion, sustaining bruises of the left side of the body of a slight nature, although he lost consciousness at the time. After three weeks' hospital treatment, with complete medical, surgical, and X-ray examinations, he was pronounced cured. He soon developed pains in the first ribs of the left side, which steadily advanced towards chronic fortnightly attacks lasting fourteen to sixteen hours, during which boring pain "as if a solid object sought egress" was manifest, followed by exhaustion. After three years of variable treatment and continuous examinations a diagnosis of traumatic hysteria was made and analysis begun. The details of the analysis cannot really be abstracted. They must be read. An initial phase of a stormy transference is presented, with various symptomatic acts. One of these showed definite passive homosexual trends. Later a gentler and more rational transference was manifest and the dreams changed slightly. Flying dreams appeared, interpretable as means of compensation to the treatment.

The patient's personal traits were of much interest. Methodical, practical, ambitious, and a leader in his group, he had power with amusement, even if deficient in style. Self-taught and acquisitive, he collected a manuscript library of ideas, poems, and striking sayings, and kept them evolving in different new volumes. He was orderly in his bank sheets and had a penchant for neatness in his writing and bookkeeping, all indicating a fair degree of sublimation of the anal-erotic trends. Natural history and evolutionary questions of a more or less superficial kind interested him. His early history is given with definite grandparent constellations: His grandmother accidentally stepped on his thumb, which has just stopped its oral-erotic activities. She also played a part in threats—castration. Certain tooth symbolisms were connected with the grandmother. Grandfather and father stood for manliness and independence. At fourteen he was made a baker's apprentice; he liked

kneading dough and was fond of cooking. As later chemical assistant aromatic and scented fluids interested him. After a love disappointment he entered the tram service. Initially a driver, having cut a man in two, as a major incident in a number of minor accidents, he regressed to a conductor. At twenty-four he married. No children were born.

In the analysis it was surprising to find that the X-raying was of more importance than the accident. He was much taken with the procedure and as part of its operations expected "an instrument to be thrust in his loin." This in the unconscious was greatly elaborated and constellated about the passive homosexual phantasy. The pain attacks seemed to follow a definite ritual. He became silent and irritable, being sharp and curt to his wife; women irritated him, even at the hospital. Constipation was marked. He passed wind and bowel movements were resumed.

The whole pantomime impressed the author as a birth phantasy. At first conceived of as ridiculous, the author notes, in a footnote (p. 265), that a colleague intuitively came to a somewhat similar conception. Early childhood memories were now evoked which were relatable to the pregnancy phantasy. Further, an early peculiar bowel difficulty could be interwoven in the history. It took place about the time of his marriage and was treated by various means. Stomach lavage was among them and analysis revealed its fellatio importance. The spastic constipation which then developed could be understood as a displaced resistance to the homosexual wish. Naturally suppositories were very intriguing and were used by the attending doctor for some time.

The marriage situation was complex. Childless himself, an illegitimate girl had to be reckoned with, and he later took her into his home. This constellation is rich in determinants and cannot be reproduced here: This takes up Part I of the author's presentation. Part II, sixteen pages, deals with deeper layers of the analysis, which must be consulted in the author's own final summary. [J.]

Holstijn, A. J. W. CASE OF TORTICOLLIS TIC. [Int. Zeitsch. f. Ps. An., 1921.]

A patient with a torticollis tic limited to the spinal accessory innervated muscles. It was unknown when it at first appeared; about before three years. The patient was impotent. During the analysis he remembered that the first appearance occurred shortly after the death of his elder sister K. One night when desiring to cohabit with his wife, he had suddenly started up in fright just before the supreme moment, because he had the feeling that K. was coming into the room. Lying over his wife he had lifted up his head sideways and thus made the typical movement of a cramp of the spinal accessory. Later on this movement returned whenever he only thought of coitus, and finally it remained an almost constant tonic cramp. Exactly the same movement

he had formerly often made when he had made his girl masturbate him in an alley into which the window of K.'s room opened sideways from above him, and he had spasmodically looked to see if K. was there. The very first time that he had so spasmodically looked up had been when he was five years old when his other sister T. had forced him to infantile coitus experiments, and he repeatedly looked up to see whether his elder brother, who used T. for the same purpose, was coming.

Besides the reproduction of the situations above described, which meant a dread of the punisher of incest, since he had tried to identify his wife with his infantile incest objects, mother and T., the tic had some other determinants. Still before the infantile coitus experiments, his brother had forced him to sexual actions, which had laid the ground for a later repressed homosexual fixation to his brother. Thus homosexual wishes uttered themselves in the tic as a look to the wrong side, to brother and sister K. (who in consequence of a congenital bleeding wound near the anus, to which she succumbed in the end, in his phantasies appeared as a castrated man, and who had also an exquisite masculine character). When in consequence of family circumstances which strengthened the repression, he gave up his onanism, the tic had appeared in place of it. Shortly before the appearance of the torticollis he had had a sneezing tic with about the same meaning. At first when he had tried to cohabit with his wife and later when sitting downstairs in the room and only thinking of coitus, he suddenly began to sneeze continually, so that he had to give up all idea of coitus. The reason was this: Sister K. sniffed tobacco a good deal and had formerly often offered him a pinch. But curiously he seemed not to be susceptible to it and if he pressed ever so much tobacco in his nose he could not bring himself to sneeze. The snuffbox was to him a symbol of the vulva (he also could sniff voluptuously at a vulva). The sneezing was a coitus equivalent. The sneezing tic had the same meaning as the torticollis: to turn his libido from his wife to K.

After the analysis the torticollis had diminished to slight twitches, the impotence was at an end. Patient is working again normally and his married life, formerly unhappy by his jealousy and other neurotic phenomena, is changed into a normal, even most happy marriage. [Author's Abstract.]

Comby, J. ASTASIA-ABASIA IN A GIRL OF THIRTEEN. [Arch. de Méd. des Enfants, XXV, Sept. 1922, p. 543.]

The hysterical affection astasia-abasia is more common in girls than in boys. Recently a case was recorded in a baby of twenty-seven months. Its diagnosis is not always easy unless care be taken. Comby records a case in a girl of thirteen years. She had a neuroarthritic heredity. Cure was complete in fifteen days by means of the cold wet pack, with sodium salicylate internally, but without isolation. The girl came for

vague limb pains and nocturnal incontinence of urine. Two days later astasia-abasia developed and the pains persisted. She was treated by hot douches and benzoate of lithia. Two days later she was given cold wet packs for a half an hour morning and evening, with a powder containing half a gramme of sodium salicylate and an equal quantity of sodium bicarbonate thrice daily. In the recumbent position all movements were well performed. Her sensibility was perfect and there was no incoördination. Astasia-abasia is distinguished from paralytic chorea by the preservation of all movements in the recumbent position. Ordinary chorea, with its disordered movements, is quite unlike atasia-abasia. In astasia there is no fever nor any cardiac affection such as is met with in rheumatism. In some cases of astasia-abasia isolation by itself brings about a cure. The disease is essentially a psychical condition. [Leonard J. Kidd, London, England.]

3. PSYCHOSES.

Jackson and Pike. RELATION OF THE MENTAL HOSPITAL TO THE COMMUNITY. [Pennsylvania Medical Journal, Vol. XXVI, No. 4.]

These authors state that in contrast to the prevailing conception of the mental hospital as an asylum, the mental hospital to-day with its modern equipment and progressive management should stand as a medical center of the community which it serves. They outline the function of such a hospital as fivefold: (1) Its relation to the mentally diseased; (2) physicians of the hospital district; (3) public health; (4) legislation; (5) public education.

For the mental cases falling logically into two groups, acute and chronic, every scientific study and treatment should be made in order to promote complete restoration, arrest of the disease and to rehabilitate the patient either to an institutional level of living or community adaptation with proper supervision. That this great function can best be filled through a well organized community service department with intramural and extramural social service activities.

The relationship of physicians should be encouraged and the hospital's clinical and didactic material placed at their disposal for further enlightenment as to early recognition, care and treatment of mental diseases as well as a further knowledge of indications for commitment of mental patients. In matters of public health, the mental health clinic with expert diagnosticians, psychologists, psychiatric nurses and trained social workers forms one of the best avenues of approach to the education of the public as relates to mental health. Such a clinic should bear the same relationship to the mental hospital as the out-patient department bears to a general hospital and its services accessible to the schools, charitable organizations, courts of justice and penal institutions. In the matter of public legislation, the authors feel that no one is more familiar with the necessity of and type of legislation for the care

and treatment of the mentally handicapped than the hospital physician and these men should serve in any capacity in drafting or procuring such laws to this end. In the matter of public education, a great deal can be accomplished by establishing closer relations with the community by elimination of secretiveness, welcoming constructive criticism, enlightening the public as to hospital operation and its function and furthermore, by disseminating such knowledge as it may possess through trained psychiatric speakers before the medical profession, nursing profession, social, civic, philanthropic, religious and political bodies; by the publication of mental health bulletins written in lay style and dealing with prevention and treatment of mental disorder and through the activities of its mental clinics.

In closing the discussion, Dr. Pike calls attention to the activities of the Danville State Hospital, situated in a rural community with a large territory of square miles and the results of the hospital's activities. Four mental health clinics have been established, neuro-psychiatric clinics are held at the hospital for the physicians of the community, courses of instruction on mental hygiene at the Normal School at Bloomsburg, courses of lectures at the Geisinger Memorial Hospital, the publication of mental health bulletins, enlarged scope of furloughs with more close home supervision and physicians of the hospital have presented papers before the medical societies of the hospital community as well as subjects dealing with psychiatric studies before many other organized bodies. [Author's Abstract.]

Boven, W. INDIVIDUAL CHARACTER AND MENTAL ALIENATION. [Arch. Suisses d. Neur. et Psych., VI, 2, 317.]

The author has put the question whether each psychosis does not develop upon a mental soil peculiar to itself just as plants germinate and develop in a particular habitat peculiar to each and plainly conditioned. He has drawn the following conclusions: The original character of individuals eventually afflicted with dementia precox differs from the original character of manic-melancholic patients. Among these:

DEMENTIA PRECOX

1. Intelligence frequently defective (40 per cent).
2. Character shut-in, introverted, suspicious, distrustful, fearful, cowardly, timid, childish, docile, passive, stubborn, in general *unsociable* (80 per cent).
3. Irritable, sensitive usually (70 per cent).
4. Activity abnormal (incoherent, impulsive, passive), (63 per cent).

MANIC-MELANCHOLIA

1. Intelligence usually normal (85 per cent).
2. Character especially open, careful, conscientious, minute, scrupulous, anxious, strict, serious, expansive, general manner altruistic and sociable (70 per cent).

3. Usually not irritable or sensitive (40 per cent).

4. Activity usually normal (85 per cent).

Briefly the unsociability of the future schizophrenics is opposed to the often excessive (altruistic and expansive) sociability of the future manic-melancholic patients. These two traits of character, sociability and unsociability, are the two generic decisive ones. The social individual would incline to the manic-melancholic, the unsociable to the schizophrenic psychosis. But the primary character conditions not only the types of later psychosis, it predetermines in the same way even the variety. Thus the melancholia may develop under the form of delirium of hypochondria or of culpability. The schizophrenia may assume the aspect of a delirium of persecution, of grandeur, of mysticism, etc. These subdeterminant traits which distinguish the variety from the type show themselves provisionally as follows:

1. Delusions of hypochondria, characterological origin—primarily hypochondriac, naïvely sad, physically weak, given to love of self, egoistic.

2. Delusions of Culpability—scrupulous, anxious, moral, markedly altruistic.

3. Delusions of grandeur—pretentious, presumptuous, intellectually weak, mentally puerile.

4. Delusions of persecution—distrustful, misanthropic, unsociable.

5. Delusions of mysticism—religious, bigoted, cowardly, etc.

In conclusion the character gives the formula of the somato-psychic equilibrium. It points out before the catastrophe the defects and the dangers showing where and how the balance will be destroyed.

4. MEDICO-LEGAL; SOCIAL.

Colella, Rosolino. ON THE RELATIONS AMONG TUBERCULOSIS, NEURO-PSYCHOPATHIES AND DELINQUENCY. [*Rivista di Patologia nervosa e mentale*, 1922, XXVII, No. 1-4.]

In this study made on tuberculosis, as an etiologic and pathogenetic agent in diseases of the nervous system, and upon the relations between tuberculosis and delinquency, the author, making use of a very large clinical and anatomical material, examines the action of tuberculosis in man from the standpoints of predisposition, symptomatology, pathogenesis, and microscopic anatomy. On the basis of clinical and anatomical considerations put in evidence, he reaches the following conclusions:

1. During the course of tuberculosis troubles of the nervous system are found which arise in the peripheral and in the central sphere. It is not infrequent to observe the development of multiple neuritis, with which can be associated sometimes troubles of the psychic functions; the origin of these last is bound up with the influence of the same morbid conditions that caused the polyneuritis (polyneuritic psychosis).

2. Tuberculosis becomes a pathogenetic agent in the neuropsychopathic diseases. The bacillus creates alterations of the nervous tissue and contaminates the organism, acting by a chemical, general action of soluble products of microbial origin (secreted poisons and poisons contained in the protoplasm), the infectious agents produce a poison, and in such a manner the infection ends as an intoxication. It is these toxic substances that poison the blood and the nervous system, acting by preference upon different parts of the neuromuscular arc, upon the peripheral nerves (polyneuritis, etc.), upon the cerebral substance (elementary psychic troubles or real psychopathies), sometimes damaging both systems at the same time (polyneurotic psychosis). But for such pathogenic agents to attack the nervous elements, it is necessary that other causes also have prepared the ground (inheritance, neuro- and psycho-pathic antecedents).

3. The symptomatology of the tuberculous polyneuritis is very complex and variable. The symptoms of polyneuritis in some cases can be motor or trophic, localized or diffuse (amyotrophic neuritis).

In some other cases the nervous troubles chiefly concern the sensibility, showing pains, hypesthesia or anesthesia, hyperesthesia, hyperalgesia, delay in the transmission of the sensations (painful or anesthetic neuritis).

In other cases the sensory troubles may be associated with more or less diffuse paresis, with muscular atrophy, with loss of the reflexes (sensorymotor type). Usually to these phenomena vasomotor and trophic troubles (cyanosis, edema, alterations of the skin and of the nails, eschars, etc.) and general symptoms (dyspeptic troubles, obstinate sweatings, impaired secretion of the urine, emaciation) are added. Disorders of the psychic sphere are sometimes associated with symptoms of the multiple neuritis.

4. The psychic syndrome, independently from its not frequent combination with the phenomena of the multiple neuritis, shows a remarkable variety of morbid types and well-defined clinical forms. General pseudoparesis, convulsive and psychic epilepsy, psychoneurasthenic states, dementia precox, acute mental confusion, manic-depressive psychosis, acute paranoia, hysteroid states, mental weakness are real psychopathic syndromes. Besides this psychic troubles of tuberculous people show themselves with an elementary disorder of the mind; to which belong the particular mental condition of the tuberculous people, and likewise suicide, prostitution, and delinquency.

We can find, at last, polyneuritic psychosis, of tuberculous origin, which affection we must entirely distinguish from the psychopathies of the people with tuberculous infection. Our observations and those scattered in the scientific literature do not authorize us to affirm that the tuberculous neuropsychopathies are specific forms of disease.

5. The anatomical alterations observed in the peripheral and central nervous system, confirm the mode of action of tuberculosis upon the entire cerebrospinal axis. We find degenerative damages of peripheral

nerves, sensorymotor or mixed, spinal and cranial (parenchymatous neuritis) and degenerative atrophy of the muscles. These neuritides can be associated with damages of the spinal marrow and of the other central organs of the nervous system. But they can be found, just the same, in subjects where the nervous centers and the spinal roots do not show any damage. The extreme alterations of the matter of the neuromuscular arc belong, almost without any exception, to the chronic forms, and reveal the intense and diffuse action performed by the tuberculous poisons.

6. The relation between tuberculosis and delinquency is pretty close. Crime, and sometimes suicide, perpetrated by tuberculous people, show how dangerous they are. Crimes against people prevail (woundings, aggressions, murders, and so on); less frequent are sexual crimes (outrages against decency, carnal violences, etc.); crimes against propriety are very rare. The perversion of the disposition of the mind and the mental weakness are the morbid manifestations to which we must ascribe numerous misdeeds, against themselves or against others, perpetrated by tuberculous people, the cause of which depends on the toxemic state, and likewise on the constitutional anomaly of the patient.

7. From the medico-legal judgment the responsibility of tuberculous people, in the crimes that they can perpetrate, it is necessary to distinguish, as far as possible, two different entities of mental disorders; elementary disorders, common to every ill people (mental state of the tuberculous people), and complex disorders, observable in the subjects that show clearly psychopathic forms (tubercular psychoses and neuropsychoses).

In judging about penal responsibility, we must, in general, value this as lessened in the tuberculous people. Only judgment directed upon the real scientific elements of every case, can determine the medico-legal sentence or the degree of responsibility.

8. In comparison with society, that the tuberculous person is inclined to offend and unceasingly offends by the same his morbid cerebral condition, he is to be considered as a dangerous person. Therefore he is a fellow that ought to be permanently detained parted from the society, because his morbid cerebral condition is to be judged permanent.

9. Prophylaxis against tuberculosis is at the same time the prophylaxis against the crime of the tuberculous people. This prophylaxis we can sum up in four essential principles: "Conjugal marriage and help to motherhood and to childhood," "Scholastic hygiene and parascholastic institutions," "Problem of popular devillings," "Compulsory insurance against illness and invalidity."

Moreover, the struggle against tuberculosis has a new lead traced by the last acquisitions on the means of defense of the organism, against the bacillus of the tuberculosis, and on the tuberculous immunity. Could preventive vaccination reach to prevent the infection, would man become free from tuberculous diseases, and from crimes which proceed from the tuberculous intoxication? [Author's abstract.]

BOOK REVIEWS

Stekel, Wilhelm. NERVÖSE ANGSTZUSTÄNDE UND IHRE BEHANDLUNG. Vierte Auflage. [Urban und Schwarzenberg, Berlin und Vienna. 14 mk.]

This was the first large work of Stekel's which appeared in 1908, when the author had received his initial stimulus from Freud, and still remains one of his most valuable contributions. Its fourth enlarged and rewritten edition signifies its continued value and need, and offers an opportunity for its further recommendation in these columns.

Stekel was unable to agree with Freud that a pure anxiety neurosis on a somatic basis was a justified generalization, and more and more he has maintained the presence of unconscious psychical components in the anxiety neuroses. We are not inclined to give any full discussion here of the points at issue, important as they may be for the development of the theoretical aspects of psychopathology. Stekel here calls attention to the growing abuse of lay psychoanalysis, and this work shows how helpless the nonmedical analyst must always remain in face of the complex problems concerning anxiety states. When the stupid lawmakers cease to uphold artificial distinctions between body and mind in medicine, then, and not before then, will the public be freed from the humbug pseudoanalysts, prophets, and professors of Indian philosophy and other swami crooks, and pseudo religious dabblers in the work of healing. Had the medical profession itself been better oriented in psychopathological principles much of the need for these hangers on would have been unnecessary. The law is commencing to recognize the dangers in much Christian Science medical practice, and we hope soon to find more enlightened legislation relative to medical practice.

Some of this work has appeared in English dress. We hope it may prove itself of sufficient value to justify a complete translation of this stimulating though at times overzealous work.

Meagher, John F. W. A STUDY OF MASTURBATION AND ITS REPUTED SEQUELAE. [William Wood and Company, New York.]

A short, concise, and readable discussion of the whole problem of masturbation, showing it in a reasonable and rational setting as but a normal phase in the genital organization of the libido. The author shows, as Stekel has long maintained, that normal masturbation has little bad effects and that the pathological masturbation is a result rather than a cause.

Altogether a book to be read as a sane discussion of an important problem.

Sampson, C. M. *PHYSIOTHERAPY TECHNIC.* [C. V. Mosby Company, St. Louis.]

An interesting book written with conviction and a special brand of optimism which the author aptly terms "peptimism." It is that good old variety of "Faith with Works" that is sorely needed in medicine not only for the type of cases which the war brought on in bunches, but also for a host of minor disturbances all too hastily entitled neurasthenia.

We heartily recommend the work. There are modalities whose actions we conceive are quite different from the author's conceptions, but this is no place to discuss the ever present influence of psychological forces even in the utilization of physical modalities—a feature definitely neglected in the author's rather breezy recital.

Myerson, Emile. *DE L'EXPLICATION DANS LES SCIENCES.* [Payot et Cie, Paris.]

This is a singularly lucid and straightforward discussion, in two volumes, of the development of our methods of explanation of natural phenomena.

Man has always felt curious not only about himself but also about the universe. To explain is to be able to adapt. To apprehend reality is to conquer nature.

Myerson has most delightfully dealt with the means by which mankind has attempted this effort, and the philosophically inclined reader will find much entertainment, enlightenment, and stimulus.

Smith, G. Elliot. *THE OLD AND THE NEW PHRENOLOGY.* [Oliver and Boyd, Edinburgh.]

Elliot Smith, in his usual delightful manner, here in a Henderson Trust lecture rescues Gall from the contumely which has been heaped upon him in various quarters, and shows that he was a much better anatomist and physiologist than one might gather from reading the usual hypercritical hand-me-downs so frequently quoted. Smith goes over the old phrenology which was but an insignificant part of Gall's teachings and shows how much better anatomist and physiologist he was than, for instance, Cuvier, one of his most outstanding opponents.

The brochure then goes on to discuss some of the newer localizations of cerebral function in the inimitable manner of this remarkable author.

Vincent, Swale. *AN INTRODUCTION TO THE STUDY OF SECRETION.* [Longmans, Green & Co., New York. \$3.50.]

Vincent has given us an excellent account of the endocrine glands which was marked by a praiseworthy conservatism, if not with a dash of skepticism.

He here approaches the larger subject of secretion in general, in which, after dealing with certain structural facts, he enters into the functional activity of glands chiefly from the physicochemical aspects, and then also takes up in detail the glandular activities of the endocrine group.

The account is not exhaustive, but is a conservative estimate of what modern physiology believes to be reasonably so.

The book is quite readable and offers to students and practitioners alike a trustworthy short summary of recent work and ideas bearing upon secretion.

Roger, Widal, Teissier. NOUVEAU TRAITÉ DE MÉDECINE. Fascicules VIII. PATHOLOGIE DES GLANDES ENDOCRINÈS TROUBLES DU DEVELOPPEMENT. [Masson et Cie, Paris.]

This system of medicine by Roger, Widal, and Teissier has been mentioned here before. The four volumes on Nervous Diseases were examples of the best type of French neurology. The present volume of 460 pages gives us an up-to-date treatise on Endocrinology.

It consists of the following chapters: General Developmental Disturbances, by Pagniez; Pathology of the Hypophysis, by Sezary; Acromegaly, by Souques and Foix; Pathology of the Pineal, by Sezary; of the Thyroid, by Apert; Myxedema and Exophthalmic Goiter, by Souques; Pathology of the Parathyroid, by Harvier; of the Thymus, by Bory; of the Suprarenals, by Josué and Godlowsky; Gonadal Insufficiencies, by Apert, and Pluriglandular Syndromes, by Claude and Baudouin.

This is a safe, practical series of purely descriptive accounts of major situations. It is well written, well illustrated, and while containing little new, it is an excellent résumé of existing knowledge on the subject.

Sollier, Paul, et Courbon, Paul. PRATIQUE SÉMIOLOGIQUE DES MALADIES MENTALES [Masson et Cie, Paris.]

The authors here present a closely written work of some 458 pages, with 89 figures in the text, devoted exclusively to the symptomatology of mental disorders. The student confronted with a strange, bizarre, or unique bit of behavior is here led to a greater understanding in current terms of descriptive psychiatry of what is expected and can round out his picture to correspond with some diagnostic rubric.

It is a very valuable account of mental symptomatology, a little too formal in its allegiance to older conceptions which a deeper knowledge of more recent movements in psychopathology would have reshaped with more biologically united patterns.

Dingler, Hugo. DIE GRUNDGEDANKEN DER MACHSCHEN PHILOSOPHIE. [Johann Ambrosius Barth, Leipzig.]

Henning, Hans. ERNST MACH ALS PHILOSOPH, PHYSIKER UND PSYCHOLOG. [Johann Ambrosius Barth, Leipzig.]

Mach's ideas, although widely utilized, are little known in current neuropsychiatry. He was undoubtedly one of the most important of the founders of modern phenomenology, an early pragmatist in the building up of truthful propositions, a forerunner of Semon in his ideas of memory and of Pavloff concerning conditioned reflexes and sensory physiology.

This first small brochure gives a short sketch of his life, a portrait, a rapid summary of his contributions to physics, mathematics, physiology, and psychology, and closes with an interesting setting down of the details in some of Mach's "Note Books" indicating the manner of his work and thought.

It is a fascinating small volume devoted to the life of a large figure in the early evolution of modern sensory physiology.

Henning's book is a much more serious undertaking, and because published during the earlier war period it has been almost entirely overlooked in English literature. It is a very careful monographic treatment of Mach's ideas and of their development. Henning, who has just given us one of the most important studies on "Smell" in any language, is well qualified to tell this story of one of the most important series of contributions to modern sensory physiology, psychology, and philosophy.

The student who would pretend to be acquainted with the forerunners of modern pragmatic, behavioristic, or neo-Heraclitean movements in physiology, psychology, or philosophy will profit by this volume.

Pieron, Henri. *LE CERVEAU ET LA PENSÉE.* [Felix Alcan, Paris.]

By reason of his editorship of *L'Année Psychologique*, as well as his teaching work, Pieron is in very intimate contact with the movements in the psychological world. He here gives us a rapid cross-section of some of the formulations concerning the neurophysiology of cerebral function.

On the whole it is fairly satisfactory. It is thoroughly up to date on the sensori-motor side of neurology, but we fail to find in it the real dynamic conception of the body as a whole in its general neuro-biotaxic setting. It is particularly weak in its portrayal of the "living" aspects of the bodily cravings; the emphasis remains as of old upon the gnostic and discriminative sociotropic mechanisms. How the brain really functions other than in the field of conscious symbolic images is so much more important than its activities in this really restricted region that until these vastly more important cerebral activities are better analyzed we shall still be led by the nose by scholastic logic and be satisfied with living in phantasies instead of managing realities.

Pieron, Henri. *L'ANNÉE PSYCHOLOGIQUE.* Vingt-Troisième Année, 1922. [Felix Alcan, Paris.]

This valuable year book appears now in its twenty-third year revived through state subvention and hopefully to appear annually as heretofore; a volume with some most interesting original studies, and a digest of the French and foreign psychological literature, technical and applied, for the year 1922. Since the *L'Année Biologiques* has suppressed its bibliographic review of "Mental Functions," these titles have been taken over by the present publication, thus considerably enriching its importance.

Pieron himself contributes a memoir on the Mechanism of Sub-

jective Color Apparitions; Foucault one on External Inhibitions Concomitant with the Fixation of Images, and Mme. Pieron two, one upon An Experimental Study of Sensorial Transfer, Vision and Kinesthesia in the Perception of Length, and a second upon Psycho-technical Studies on Some Tests of Aptitude. Dwelshauvers has a short contribution to the "Memory of Form."

Notes and Reviews by Pieron on Differentiation of Tests of Development and of Aptitude, and on Lateral Auditory Perception and by Myerson on Primitive Mentality by Levy Bruhl. Then follow the reviews of psychological literature. We know of no work of its kind that accomplishes so much in its field as this excellent year book.

Guardia, Antonio. LA CLINICA DEL SIMPÁTICO Y PARASIMPÁTICO. [Libreria Cervantes, Paris, Rue de Richelieu 26.]

The author, who is a director of the Biological Laboratories of Barcelona, has here written a short and yet comprehensive monograph on the vegetative nervous system following the initial stimulus of Eppinger and Hess, which has been more or less popularized by Pottenger.

It is not as extensive as the monographs of Higier, Guillaume, Müller, nor the chapters on the Vegetative Nervous System in Jelliffe and White's Diseases of the Nervous System, nor the excellent theses of Pendi or Gaskell, but it nevertheless represents an excellent critical study in this rapidly advancing field of internal medicine as controlled by the functions of the vegetative nervous system.

Alexander, G., Marburg, O., and Brunner, H. HANDBUCH DER NEUROLOGIE DES OHRES. I Band. 2 Haelfte. [Urban u. Schwarzenberg, Berlin and Vienna. 33 mk.]

A second part of this monumental work is just to hand. It opens with a most thorough and finished chapter on Pathological Anatomy by Alexander, dealing first with the histopathology of the nervous mechanisms of the ear, most beautifully illustrated. This is followed by the General Pathology of the Nervous System, particularly as it bears on cellular and pathway changes connected with the acoustic functions. Heschl's convolution changes, alterations in the medial geniculate, and more general pathological alterations are here taken up.

Clinical Methods of Investigation occupy section IV of this work, Cemach of Vienna contributing a chapter on the Objective Proofs of Organic Deafness by means of the Cochlear Reflexes. This is an extremely valuable chapter not only for otologists and neurologists but for those dealing with medicolegal situations involving claims for compensation because of deafness. The general features of Acoustic Functional Testing are taken up by Hugo Frey.

The Vestibular Nerve both in its Peripheral and Central Extensions is next exhaustively dealt with by H. Brunner. The significance of all of the various forms of nystagmus is most clearly set forth. In an appendix to this chapter J. Ohm contributes a discussion

on Tremor of the Eyes. The final chapter is a completely illustrated monograph on the X-ray Diagnosis of Diseases of the Organs of Hearing by Arthur Schiller.

As already intimated, this is the finest classic of modern work on the neurology of the ear.

Stern, William. PSYCHOLOGY OF EARLY CHILDHOOD UP TO THE SIXTH YEAR. Translated by Anna Barwell. [Henry Holt & Company, New York.]

The reviewer can recall that at the birth of his first child Preyer's "The Soul of the Child" was the accepted and almost only rational text, and copious notes were made on the margins as a sort of diary of this particular child's mental evolution.

In the nearly thirty years which have intervened enormous progress has been made, which in America, thanks chiefly to Stanley Hall, have put the whole situation upon a much firmer and broader foundation. At the same time, watching this abundant development, the selfsame reviewer has been overwhelmed with the avalanche of material which has gradually accumulated.

Fortunately there have been those whose special interests have been to gather and digest this mass of material, and one of the most outstanding authorities has been the author of this work. It now stands, and fortunately made available for English readers by a very excellent translation, where Preyer used to stand, but an authority with a fuller development made possible by a careful sifting of the great amount of careful conscientious study of the past thirty years.

We have no hesitancy in saying that this is a very valuable and important text even if too frequently the author shows marked prejudice to the obvious interpretation of many situations, especially with reference to his fears concerning the *innocence* of childhood being interfered with by honest observation.

The author is quite anti-Freudian, in our opinion much to the detriment of his work, and were he less argumentative about it we could the more respect his judgment and class him as a real scientist rather than an opportunist.

We are distinctly of the opinion as we read his work that his distortion of the Freudian principles rules him out as an unbiased critic of them. It is of much interest to note how much space and pains are taken to controvert the psychoanalytic principles. If they did not prove so thorny why spend so much time upon them? And furthermore, the author most consistently fails to distinguish the "unconscious" factor in his discussions. He deals with most of the Freudian mechanisms at a conscious level, and this shows his singular misapprehension of the real significance of psychoanalysis as applied to pedagogy. By a simple shift in his position he might have seen that much of his criticism of psychoanalysis is pure word play, and that he has preferred to be a superficial interpreter rather than a student of behavior in its intrinsic biological significance. He shows a singular stupidity to the significance of what Freud has termed the "libido," preferring to follow obvious and conventional attitudes.

Psychopathology is to him quite, as yet, not understood. Apart from this bias we find the work very valuable.

Kafka, Gustav. HANDBUCH DER VERGLEICHENDE PSYCHOLOGIE. BAND III. DIE FUNKTIONEN DES ABNORMEN SEELENLEBENS. [Ernst Reinhardt, München.]

This valuable work presents in this the third volume four sections. H. W. Gruhle writes on the Concept of the Abnormal, in which the formulation of average and ideal types and other related considerations are clearly set forth. He aspires to write a chapter on "Psychopathology," but we do not find it very satisfactory even though one must grant it considerable scholarship.

Similarly we are not very enthusiastic over Göhring's chapters on Criminal Psychology, even though he has dealt with the subject in quite a unique manner. He has more or less followed the criminal through all the phases of an antisocial act, even to his execution. It is truly behavioristic but it is not as convincing as Dostoiefsky, Balzac, Flaubert, or other great novelists who have dealt with the problems from much the same angle.

Sante de Sanctis has contributed an extremely scholarly chapter upon the Psychology of the Dream. That the dream should be elevated to so primary a position in such a handbook is undoubtedly due to the psychoanalytic movement inaugurated by Freud. The author, however, develops his theme along so-called physiological lines, first going over various theories of sleep, observations upon sleeping positions, and finally the structure and dynamics of the dream, in which he leans heavily upon his own previous contributions. Here one finds an excellent résumé of many previous studies of the dream and recognition of the Freudian mechanisms, although couched in different language. De Sanctis is strong for autopsychanalysis. We wish we could grant him all of his suppositions but practical work with repressed material makes us less optimistic. His treatment of the libido theory is a trifle fragmentary, although not openly antagonistic. The historical presentation of the theories of the dream is short but interesting. A special chapter is given to Freud's contributions, in which critical expression is offered regarding the value of the manifest content of the dream (Maeder, Jung) and a general critique which cannot be entered into here but is not without interest, even though we believe de Sanctis does not appreciate the enormous significance of the "unconscious" in its phyletic mnemic aspect. We feel convinced that had he attempted analyses of the malignant narcissistic neuroses the archaic mnemic material offered would make him more cautious about disregarding its importance. Furthermore, we feel that his statements regarding pansexualism are quite beside the real issues, for he undervalues the biological significance of the libido theory. If he knows of any mechanism by which evolution from amoeba to man has been possible other than the continuity of the germ plasm—*i.e.*, sexual mechanism—we confess our ignorance of it. De Sanctis clearly shows he has not entirely grasped the dynamics of mnemic inheritance so far as the reproductive mechanism is concerned

and its implications for the unconscious. His own theory thus falls short of better ones in our opinion.

Finally Allers gives a chapter on Sexual Psychology which does not quite fill the bill.

On the whole this volume upon general psychopathology, while interesting, does not seem to come up to the standard of its predecessors.

de Selincourt, Hugh. ONE LITTLE BOY. [Albert and Charles Boni, New York.]

While casting about for an opportune phrase with which to begin this review, a recent article in the *Open Court* on the "Ethics of John Dewey" popped up quite spontaneously, and the lines, not penned for the first time by Dewey, but having the founder of the Christian Religion as their sponsor, were looked up and are here repeated. Dewey believes that we have been unfair to the helpless child in forcing our beliefs upon it. "Education," he says, "becomes the art of taking advantage of the helplessness of the young; the formation of habits becomes a guarantee for the maintenance of the hedges of custom."

When the educator, in the present instance the headmaster Lake, attempted to deal with the problem of masturbation, for this is the setting with which this fascinating little story deals, we see only too clearly the maiming, disfiguring, and even criminal aspects of education when placed in the hands of stupid and hypocritical "purists."

The chief character of the story, a little boy, is peeped upon and discovered in the adolescent reaching out of masturbatory experience. The "purist" teaching schoolmaster canes him publicly, and with evident sadistic delight, a vicarious enjoyment of his own, projected over to the little sinner who goes weeping to his mother with blood clots in his knickers.

Here is most subtly and delicately told the entire history of a pubescent experience with that bogey of the hypocrite, masturbation. How long will it take educators and physicians in general to see masturbation in its essential biological significance. Doctors have been unduly stupid in their imposition of faulty teachings regarding this universal phase of psychosexual evolution. Stekel, prominent among the moderns, has shown how disfigured and distorted has been the understanding of educators concerning this problem, and this little story gives us a homely and sympathetic subjective history, full of interest and human concern of value to all mothers and human beings who would not try to forget their own past and fill up their amnesia with smug hypocrisies about purity and such nonsense.

One can only welcome such a book, so artistically conceived and sympathetically written. It is worth much more than the majority of scientific discussions on the problem. Even one of the latest emanations of the Social Hygiene Society repeats the old bunk about masturbation and its dire consequences. Meagher's recent short treatise is a welcome antidote, and we confidently look forward to the

day when the self-appointed apostles of God will cease their preachings and the people will be delivered from their delusions concerning the authenticity of this type of authority.

White, William A. *OUTLINES OF PSYCHIATRY*. Tenth Revised Edition. [Nervous and Mental Disease Publishing Company, Washington and New York.]

This work of Dr. White's has been the leading textbook of psychiatry in the United States almost from its first edition. With each succeeding revision it has grown in favor and authority, and now, in its tenth edition, incorporating the most valuable of the recent advances in psychopathology and psychiatry, it stands preëminent not only because of its grasp of the movement within the science of psychopathology and the art of psychiatry, but because of its author's singular facility for extracting from the many diverse studies in the field the kernel of their meaning and being able to present it in clear simple terms.

This faculty for clarity of expression of complex and subtle phenomena has given this work its great pedagogic value, while at the same time the author's daily contact with mental disorders has given him an insight into psychological dynamics which few authors possess and even fewer the capacity to tell these intuitional aspects to others.

This edition incorporates some extremely interesting newer material which will render the work of even greater value to general practitioners who may seek for light in this to them almost unknown field. These features take up general problems of extraneural pathology, showing the effects upon the various bodily systems of the inner drive. Thus the cardiovascular system responses to certain types of mental disturbance are most instructively shown. Why does the dementia precox type of individual tend to break down in his respiratory organs, and the paranoid type develop compensatory cardiovascular hypertrophies and go under by hemorrhagic or hyperplastic processes, etc.? This and similar aspects of an integral unity of so-called "body and mind" stamps this work as more than a treatise on psychiatry, but one that encompasses a truly neo-Hippocratic ideal, namely, that psychical processes represent the essential dynamics of the human body, to which all other forms of energy exchange are adaptive reactions. In spite of all kinds of externally hindering processes, accident, infection, surmenage, etc., the human organism strives to carry out "purposeful aims," conscious in part, immensely greater unconscious. This interactionism is registered in both metabolic and social behavior. When a break occurs in the former we speak of organic disease, benign or malignant, when in the latter we deal with syndromies of neuroses, psychoses, or antisocial conduct.

It is this larger aspect of affiliation of the psychiatric discipline with medicine in general that has characterized these *Outlines* from the start.

Charon, René. LA PSYCHIATRIE EN CLIENTÈLE. COMMENT GUÉRIR? Bibliothèque des Praticiens. [Publiée sous la direction du Dr. Ch. Fiessinger, A. Maloine & Fils, Éditeurs, Paris, 1924.]

One wonders that such a book as this is written to-day as it stands. The author's purpose is a worthy one, forcibly expressed in his introduction. He would have every practitioner and every medical student consider the mental disorders as a part of medicine that cannot be neglected, and he would have each one receive knowledge of them as part of his training. He has endeavored to bring some such knowledge before his readers in simple and practical form. But when, to-day, an author leaves out of sight the striving of a personality between the expression and the control of his instincts, the dynamic activity going on in the psyche in the struggle between intellect and the emotions, the involvement of the various functions of the personality, psychic or physiologic, in such a dynamic conflict, then he is writing only a small and unilluminating portion of psychiatry. He may describe accurately observed states, as far as such external observation can go; he may name and discuss psychic "faculties"; he may talk of attitudes "excentric," "concentric," "polycentric," and all the rest; if he goes no more deeply than this, his advice for treatment or for prophylaxis, his attempt to make clear the nature of mental disorder can be of little avail. The writer shows observational knowledge of external appearances of these disorders; he knows their relation often to organic conditions, but this also from the superficial point of view. The consideration of all these more or less definable conditions as part of that greater functioning of a struggling personality—often, it is true, handicapped by heredity or other disability—this is the psychology and the psychiatry of the present day which gives ground for therapeutic and prophylactic action. To present mental disorders in any other light is but to repeat what has not brought hope in the past to the sufferer nor enlightenment to the physician who has to aid the sufferer.

Bouman, L., and Brouwer, B. LEERBOEK DER ZENUWZIEKTEN. Deel 1, 2d Gedeelte. [De Ervers F. Bohn, Harlem.]

The first volume of this representative Dutch "Textbook of Neurology" has been reviewed in these pages. This, the second section, a book of 800 pages, is before us.

It contains first a comprehensive and valuable chapter on Examination Methods by the late Professor Salomonson, richly illustrated, which could serve as a model for present day neurological standards. Not only are the various phenomena described and illustrated but their physiopathological significance rapidly but penetratingly elucidated. It is a complete semeiology of 410 pages which one regrets is not available in a more widely comprehended language, as it is most complete and valuable.

Dr. F. S. Meijers has written a valuable chapter on Lumbar Puncture and K. H. Bouman a short chapter on the Examination of the Mental Faculties. The Disturbances of Speech is by L. Bouman.

Aphasia and Apraxia are exhaustively discussed. The same author has two further chapters, one upon Pharmacotherapy of the Nervous System and one upon Psychotherapy. In this latter the various developments of psychotherapy, hypnosis, suggestion, persuasion, Janet's methods, autoanalysis, psychoanalysis of Freud, and other movements are comprehensively set forth. Dietetic and electrotherapeutic methods are described by Salomonson, and van Breeman has an interesting series of chapters on physiotherapy of nervous disorders, including special indications of hydrotherapy, mechanotherapy, gymnastics, sport, heliotherapy, climatotherapy, etc. M. A. de Kock contributes a chapter upon surgical therapeutic procedures.

The work is remarkable for its precise formulations and almost aphoristic method of discussion. No space is wasted, and direct, useful, and well-supported ideas are convincingly set forth. It is a notable achievement.

Marquardt, Martha. PAUL EHRLICH ALS MENSCH UND ARBEITER. ERINNERUNGEN AUS DREIZEHN JAHREN SEINES LEBENS (1902-1915). Mit einer Einführung von Dr. Richard Koch. [Deutsche Verlags-Anstalt, Stuttgart, Berlin, Leipzig.]

Time is generous in bringing the work of a great man into its true relation to the progress of mankind. Yet it is inexorable as it overlays the solid foundation stones with those of lesser degree. These, nevertheless, are indispensable in the furtherance of the structure once begun. This little book is a labor of warm personal appreciation which brings once more into clear light the character and the daily work of a man the brilliance of whose fame has suffered its first slight obscuring. The work of Paul Ehrlich has passed from the first miracles of his discovery of salvarsan through the therapeutic testing and modification which give a discovery its final undisputed place in the history of medical science. Such testing and modification, moreover, are quite in accord with the scientific spirit of Ehrlich himself. It was in this spirit, his biographer tells us, that he carried out his lifelong researches and offered to the world the most striking fruit of his long labor. Koch, in his introduction, compares him with Paracelsus, who could not complete the scientific task which he saw opening before him, but whose titanic will has made itself felt throughout the centuries in the paths to which he pointed the way. The writer of the book has presented Ehrlich the man, earnest in research, devoted all his life long to the pursuit of the goals which opened before him, as his technical investigations lifted him from one achievement to another. She reveals his personal traits of character, as these were manifested in daily intercourse. Such is the figure of the man, humanly lovable, earnestly absorbed in his chosen work, which the book sets before us, that we may better appreciate his service to humanity and to the science of medicine. The writer's close daily contact with the subject of her study has somewhat interfered with the true perspective needed for a biography. Some trivial details could have been eliminated and the character would have stood forth in still clearer lines.

NOTES AND NEWS

The annual meeting of the *National Association for the Study of Epilepsy* will be held at Richmond, Virginia, on May 11 and 12, 1925, immediately preceding the sessions of the American Psychiatric Association, which meets at Richmond on May 11-15. Papers on the subject of epilepsy will be presented by Drs. Menninger, L. Pierce Clark, Damon, Gibbs, Tucker, Patterson, and others.

The fifteenth annual meeting of the *American Psychopathological Association* will be held in Washington, May 7, 1925, at the New Willard Hotel.

Present plans are to have the program on the afternoon and evening of that day. A subscription dinner is planned, to follow the afternoon program. A preliminary list of contributors to the program include the following: Drs. Alfred M. Barrett, J. Ramsey Hunt, L. Pierce Clark, L. E. Emerson, Harry S. Sullivan, and Trigant Burrow.

A meeting of the *American Psychoanalytic Association* will be held in Richmond, Va., at about the same time that the American Psychiatric Association meets, May 12-15. The members are requested to forward to the secretary titles of papers they wish to read.

The American Neurological Association will meet in Washington, D. C., at the New Willard Hotel, on May 5, 6, and 7.

N. B.—All business communications should be made to *Journal of Nervous and Mental Disease*, 64 West 56th St., New York.

All editorial communications should be made to Dr. Smith Ely Jelliffe, Managing Editor, 64 West 56th St., New York.

The Journal

OF

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An American Journal of Neuropsychiatry, Founded in 1874

ORIGINAL ARTICLES

SOMATIC PATHOLOGY AND PSYCHOPATHOLOGY AT THE ENCEPHALITIS CROSSROAD: A FRAGMENT¹

By SMITH ELY JELLIFFE, M.D., PH.D.

This communication has purposely been designated a "fragment." My chief excuse for its rudimentary nature orients itself in the direction of your artful secretary who, evidently classing me as the little Jack Horner of this society, apparently believes that I keep a Christmas Pie always ready and can pull out a plum at a moment's notice. But, to partly shift my metaphor, if his too vigorous shaking should dislodge a green gage or two, possible several, still so unripe and so provoking as to threaten a colic, call upon your secretary for relief.

Apart from these pleasantries, I had in mind the presentation of a theme not without very definite interest to this society and possibly an indication of a problem of far reaching importance to the general aspect of a growing type of thinking in medicine, *i.e.*, to a relational pathology.

Pathology, as a branch of natural science, has hardly arrived; it like most of the various branches of medicine remains largely at a descriptive stage and is only just emerging into its riper possibilities as a branch of natural history. Should you ask me for greater authority than myself, a mere neuropsychiatrist, for this rather large and possibly presumptuous statement, I refer you to F. Krauss in his "Allgemeine Pathologie der Person," and to Gustav Ricker in his "Pathologie als Naturwissenschaft," both pathologists of the

¹ Paper first presented before the New York Psychiatric Society, April 8, 1925.

highest rank and both deploring the need for entirely new viewpoints in their special fields and along the lines herein referred to.

It may seem captious in one whose interests have long since left the laboratory after some fifteen years immersion in practical pathological peeping, not as a pathologist, but as a clinician, to still insist that the point of view of Johannes Müller, of Herring, of Mach, of Ostwald is still in need of emphasizing before any body of serious scientific workers. The laws of energetics and of specific energy capture by the human body have been more or less half heartedly assimilated. Most of us agree to them, but then right away forget their logical necessities. It is thoroughly assented to that the energy that runs the human body comes from without, and in the next breath we speak of the human body as a self-running battery, as Crile does, or in our own specialty, speak of the stimulus that proceeds from the cortex, or from the anterior horn cell, in the last instance offering strychnine to aid a poliomyelitis, or electricity to assist a hemiplegic palsy—both instances of autistic (wishful) thinking, and having nothing to do with the logically assented to generalization, that the human machine, as machine, like all living matter, lives and performs its work by virtue of its capacity to capture, transform and deliver the energy that comes from the cosmos, and hence *nothing* save a stimulus which will deliver energy in *physiological functioning* will be of any service to the helping of a diseased anterior horn cell neuron or a Betz cell neuron.

Thus if we rivet our attention to this formula of the human organism as a capturer, transformer and deliverer of energy, and with equally large vision ask ourselves—for *what purpose, or by what function*, does the human organism, as well as every other living organism *deliver* the energy which willy nilly it must capture, and must transform, there can be but one really satisfactory answer. *The function par excellence of life is the continuance of life*, whether it be in the form of Protococcus or Amoeba; Sunflower or Man, mentioning only the lowest and the highest in the plant and animal phyla respectively.

Geologists assure us that in the precambrian rocks of some of the Rockies there may be detected the skeletons of bacterial-like forms of living matter, at the same time giving us carefully guarded expressions of opinion that these rock masses are probably anywhere from 500 million to a billion years old. Thus invoking the principle of evolution we may say that life as it appears in man represents the accumulated experience with cosmic forces in this game of capturing, transforming and delivering of energy of a billion years.

The passing on of new forms of life (evolution) has finally resulted in man, and by the same token, although only 28 of the known 90 chemical elements have become incorporated into the human organism, it can work these 28 chemical elements, as transformers, through more gymnastics than any biochemist can attempt to tell us. At least I lean on the authority of one of America's ablest biochemists, A. P. Matthews, who in a recent contribution to *Some General Aspects of the Chemistry of Cells* (General Cytology, edited by Cowdrey, Chicago Univ. Press, 1924) tells us, among other useful ideas, page 21: "We are in truth minute universes composed of quadrillions of suns and planets. Who of the inhabitants living in such a universe would dream or imagine it to be conscious?"

In other words most of this vast work of the capture, transformation and delivery of energy is going on at levels far below what we call consciousness. Man, in his vanity, had always hallucinated that he knew why he did *everything*. In reality he knows not even the quadrillionth part of why he does *anything*. This is one of the unflattering revelations for which we all hated Freud for even suggesting; just as the theologically minded man, who deluded himself he was "God" has not yet forgiven Darwin for telling of his evolutionary ancestors, and goes on repeating in one form or another, "and the Lord said unto Moses," meaning thereby he was in on God's side and what he himself wanted to do he had God prompt him about it.

Not wishing to unduly prolong this introduction I would call your attention to the transcendent importance then of the billion year old function of man as well as of all life, *i.e.*, its necessity for the reproduction of life: I know that many of us mouth the old saw that "self-preservation is the first law of nature"—but like many an old saw this is only a blind. If I may commit the unpardonable sin in a so-called scientific paper of talking slang—this is the "bunk." Without race propagation there would have been no selves to preserve, *i.e.*, unless one would prefer to be *Sequoia* tree and live as such in one of the natural parks in California. The *Sequoias* have lived, as selves, for a couple of thousand years, but noble though they be, they still are the same old *Sequoias* they were several million years back.

Aristotle, many years ago called this principle which looks forward into the future, *i.e.* (reproduction), as an "entelechy"—many of us speak of it as "purpose," Freud very simply called it a "wish,"²

² Holt. The Freudian Wish.

which incorporated within experience in the unconscious memories of adaptation, *ruthlessly oriented the organism towards a definite goal.*

Thus all biochemistry—physiology—psychology—acting through types of tools such as hormone, reflex and symbol respectively, are integrated in the human being to carry on the primary purpose of race perpetuation and the secondary purpose of self-preservation. Schiller once called these forces—Love and Hunger. Freud has designated them as Libido and Ego trends respectively. Antagonists and friends, necessary the one to the other and yet in conflict, they offer examples of the great antithesis of all great forces in nature, which are bipolar, or ambivalent, from electrons to the League of Nations.

From all this flows the corollary that pathology as a part of natural history offers, in its widest aspects, no real interpretation of natural phenomena without an application of this larger platform.

It needs no stating that certain problems are confined within narrower limits. It would be a farce to explain many things by such an involved chain of causality, a blow on the head by a falling brick, for instance; death by a cyclone; possibly bronchitis from infection by measles, or an inflamed Peyer's patch in typhoid, and many others, too numerous to mention, but because many simple causality postulates are permissible it is one of the unforgivable tendencies in human reasoning to seek to be satisfied with trivial explanations of many most complicated phenomena.

It is therefore that I turn your attention to a group of phenomena by means of an individual case, which will justify my title. Namely, by means of a fragmentary analysis of a patient who undoubtedly had an encephalitis.

I would say here at the crossroads we may be able to look in two directions at the same time, one which may be designated "somatic pathology"—the other "psychopathology," and thus perhaps throw some light on the pseudo problem, as W. A. White for years has termed it, of the relationships of body and mind. It is an old difficulty this of the relativity of "structure" and "function"—but inasmuch as at our last meeting White gave an exceptionally valuable presentation of the whole problem—JOURNAL OF NERVOUS AND MENTAL DISEASE, March, 1925—it may not be amiss to get down to cases and look at a practical series of issues of which the one to be presented is but a paradigm. It is because of its relative simplicity that I have chosen it and because of this simplicity possible to be utilized in this present relation.

CASE HISTORY

It concerns a young Jewish boy born November 20, 1904. His father was born in Russia, his mother in Hungary, they were not related so far as known. Both are alive and well and all collaterals are free from diabetes,³ goiter, alcoholism, tuberculosis, epilepsy, or any now known nervous or mental disease. There were five children born. A brother nine years older—then a boy who died in infancy of whooping cough, then a sister four years older, the patient, now twenty, and a younger sister, twelve years younger. These remaining children are, so far as known, relatively healthy. The sister married about a year ago.

The patient was born without difficulty, walked and talked at the usual age, was bright and of average capacity, read at five to six, had measles only, did not wet his bed, bite his finger nails, stammer nor stutter, walk in his sleep or have other ascertainable infantile compulsive habits.

He was an impulsive, happy go lucky kind of a boy, fond of joking and joshing, was very sociable, easy to get acquainted with, fond of music, sang popular songs with much pleasure, aspired to play an instrument, but as his older brother banged the piano when he wanted to sing he never conquered the technical difficulties. He was at the average grade in high school. At twelve or probably earlier he was taught masturbation—see later the rôle played by "Jerry" by whom this genital organization period of his sexuality was influenced.

The forerunners are slightly perplexing. There are slight indications of difficulties in school at about fifteen to sixteen; he liked to play hookey with the "boys" and they went to "shows." Then something acute occurred:

Description of Delirium: Account by Brother

X. had been a student at S. Preparatory School. It was near the Easter vacation when he came home. It was either the last week in March or the first in April, 1922. He had complained of having had a slight sore throat and an influenzal condition for two or three days. The school doctor gave him the usual treatments for such ailments and thought it best to send him home for a day or two.

He came home in the early afternoon. He was running a slight temperature and was quiet and seemed depressed. We put him to bed and sent for our family physician, Dr. L. He diagnosed the condition as an influenzal sore throat, prescribing an alkaline gargle and giving a cough compound containing minute doses of codeine.

X. slept alone. He seemed quiet as far as we could tell during the night.

In the morning, along about 9 or 10 o'clock when I went into his room, he said, "Get out and let me alone. Let me rest. I had an awful night."

We left him alone. He got out of bed in the afternoon and started to wash and shave. It was apparent that something had happened to him. He acted as though he were laboring under some tremendous excitement.

When I went to talk to him in the bathroom, he was singing and shouting and laughing. "Wow," he shouted, "I like my liquor strong and my women weak." He sang and shouted and yelled while completing his toilet. His

³ Grandmother on father's side had diabetes late in life.

eyes were bright and his gestures and gesticulations spastic and exaggerated and jerky.

His teeth chattered and he shook all over like a jelly at times. I stood with him until he quieted down, for say ten or fifteen minutes. This acute stage of his delirium did not last more than half an hour, as far as I can recollect.

When he quieted down, he said to me, "I can't tell you what happened to me last night except that it was something terrible. I suffered all night. I dreamt that I died and then came to life again and saw angels. I think my heart stopped beating for a while. It was just as if I died and came back to life. Mark what I tell you. This is going to change my whole life. I'll never be the same again after what happened to me last night."

He was jumpy and nervous all day long, his teeth chattering at intervals. Toward nightfall he seemed to become his usual self again.

I was alarmed by this exhibition and at first it occurred to me that he might have been suffering from an overdose of the codeine which was in the cough medicine. I find that this was present in the mixture only in tiny dosage, not enough to have caused the disturbance.

Of course, we all worried about his behavior. But he apparently returned to normalcy the next day and went back to S. It was not for two or three months that he began sniffing through his nose, complaining of some obstruction in his nostril that interfered with free breathing. This sniffing and a talkativeness which manifested itself particularly at night were the first sequel to his night delirium.

The sniffing increased that summer. It frequently kept us up at night. I slept in his room at that time. He would talk and talk and ask me a multitude of questions at bedtime. His questions were coherent to be sure, but they became extremely annoying and finally I'd have to tell him to "shut up" in order to get him to bed.

Along about August 1st, the sniffing became so persistent that he was taken to a nose and throat man who found a definite obstruction in the right nostril. Arrangements had been made to have this removed when the automobile accident came along on August 28, 1922, and interfered.

In August, 1922, while being driven in an automobile the car skidded into a telegraph pole and the patient's nose was injured. This caused more sniffing and more obstruction efforts. A Dr. A. had treated the nose at the time, and later, June 19, 1923, brought him to see Dr. D., to whose courtesy I am indebted for the following history:

"I saw X. upon one occasion only. He was brought to my office on June 19, 1923, by Dr. A. of Mt. Holly. The patient's age was given as eighteen. Dr. A. stated that he had met with an accident in the latter part of August, 1922, which resulted in a bad injury to his nose. She stated that she personally had treated the injury, had raised the bridge of the nose and had dressed it carefully. Subsequently the boy saw Dr. L. There was some obstruction so that he could not breathe properly."

"Dr. A. described 'spells' from which the patient suffered. She stated that he would 'sniffle' at night, would go to the bathroom and in order that the family should not hear his sniffing, he would turn on the water in the basin; that at times he was very uncomfortable and on some nights

unable to sleep; that at times he breathed like a patient suffering from asthma. If his attention was diverted, the attacks usually ceased. She stated that at other times he would occasionally get into a condition as though 'suffering from tetany'; that his hands 'would get clenched.'

"The physical examination by myself yielded little of moment. The gait and station were normal. There was no tremor, the tongue was protruded in the median line and not tremulous. The lips were protruded firmly. The angles of the mouth were retracted equally well. The pupils were of average size, well rounded, equal, reacted very promptly to light and to accommodation and convergence. The tendon reflexes were normal. There were no sensory losses. There were no functional nervous symptoms present at the time of my examination; the mental examination also was negative. Laboratory findings reported negative."

"After making some suggestions to Dr. A. as to the boy's method of living, general hygienic care, further observation, etc., she left me with the understanding that he was to be placed under treatment, as far as the nose was concerned by Dr. L."

On December 6, 1923, another specialist was consulted who has kindly sent me the following history:

"In August, 1922, patient was in an auto accident, suffered a fractured nose but was not unconscious. He entered the J. Hospital for a nose operation for obstructed breathing. Prior to accident he had a tendency to a habit spasm of forcibly expiring air through his nose. While in J. he contracted scarlet fever and was sent to a Municipal Hospital. He had a light attack and in six weeks returned for the nose operation. Following the nasal operation he went to a business college one month, was still continuing the habit of forcing air through the nose. In January he again returned to high school. But it seems he did not succeed well; the patient states he had drowsy spells, would try to concentrate, then fall asleep. The teacher remarked that he would have to remain awake, or he could not stay in the class. He did finish the year of school but failed in two subjects. He states he worried constantly over the obstruction in his nose; he lacked interest in his work."

"In March, 1923 (this should be 1922), Easter vacation, he had an attack of sore throat, grippe, and a severe stomach upset. In about 48 hours this was followed by a semidelirious spell with fever; states he had a terrible dream in which he was dying and saw angels. The next day he was very much excited, seemed afraid and continually screamed, 'I will never be the same again.' He seemed to be normal the next day and returned to school, but the patient states he continued to feel sleepy in school.

July 1 (1923), a tonsillectomy was performed; immediately following this, the patient began to have spells of deep breathing through his mouth. These spells usually come on in the day time, and occur after excitement, they are simply attacks of deep rapid breathing that last about five minutes, then the hands will straighten out and be stiff and uncomfortable. At the same time the muscles of the face stiffen. At one time his feet have stiffened with the attack. The patient states that at this time, and the mother confirms the statement, that he had salivation "drooled at the mouth." His brother often remarked that he foamed at the mouth and the mother would

ask him to use his handkerchief for this. He still has this trouble, but not as bad as before. Since July he states, "he feels lazy all the time—lacks pep," he adds: he has felt this way since the scarlet fever. He feels drowsy all day long, but cannot sleep. The early part of the night he is awake, then falls asleep about 2 A.M. During the month of August, he was at a boy's camp, and felt some better there, but the breathing continued."

"In October (1922), he had another nasal operation, obstructed right nostril. States his breathing is worse since then. The patient states he is irritable and the mother confirms this, she states he seems to greet strangers warmly now, whereas before he never did. She thinks there has been a decided change in his personality."

"Physical Examination—General: The patient is a robust boy of about twenty years, pleasant and agreeable, seems overly agreeable, his reaction does not seem perfectly normal; he has a tendency to be child-like in his behavior, but this is not marked. There is a noticeable fixity of the facial expression, and his face is unduly oily with slight acneiform eruption present. There is no noticeable body stiffness, nor are his movements slowed, there is something suggestive, however, in the way he seems to maintain one position for long periods, such as holding his hands and arms semiflexed.

"Eyes: Half staring. Reaction normal, extraocular movements normal. Fundi: Retina appears slightly congested, with disk margins slightly hyperemic, although this may be normal.

"Cranial nerves: Loss of facial expression, otherwise normal. No seventh nerve weakness of either side.

"Mouth: Tongue slightly coated. Teeth O. K. Tonsils removed.

"Chest-heart sounds normal. B. P. 120/75. No murmurs.

"Lungs: Clear and resonant throughout.

"Abdomen: No masses or rigidity, reflexes all present.

"Extremities: Upper, very slight tremor of outstretched hands, power O. K. No rigidity, reflexes are overactive on both sides.

"Lower: Outside of unusually prompt and equal achilles and patellar jerks, neurologic examination is negative. No Babinski.

"Station and gait: Nothing abnormal noted."

History in Dr. B.'s private office records:

"Examination December 6, 1923: Patient is a well nourished, rather well well muscled youth of nineteen years. In appearance he does not look like the average Jewish boy, but rather of Irish descent. He gets in and out of bed easily. There is no awkwardness or any abnormality in gait, station, posture, or in use of any extremity or set of muscles, with the exception of his facial expression which is rather set and "waxy" to a slight degree. Speech is normal. Extraocular movements normal. There is no diplopia, nor is there any history of it. Tongue is clean, shows no tremor. Palate moves well. Teeth in good condition. Thyroid is not enlarged. Pupils are equal, regular in outline, normal in size and react promptly to light and in accommodation. Vision is good in both eyes. Hearing, equilibration and taste are normal. No motor ataxia in arms. No sensory disturbances anywhere in the body. Knee jerks, Achilles jerks, biceps and triceps jerks, abdominal, cremasteric and plantar responses are equal and normal. Heart action is regular. No murmurs are audible. Rate at rest is 80 with an

increase to 118 after effort. Area and position is normal. Blood pressure 118/80. Lungs and abdomen grossly normal.

"Blood Wassermann—negative. Blood count—4,470,000 red cells, 14,200 white cells, 86 per cent hemoglobin. Differential count of white normal.

"Urine—several examinations show nothing abnormal. Some mucous threads.

"He left the Orthopedic Hospital on December 24, 1923. His condition became worse. He would talk to strange people on the street; had periods of sullen anger; struck his nurse several times; and masturbated frequently.

"Though there is no positive history of epidemic encephalitis I believe that he had it, and that it is very largely the cause of his present condition. I also believe that there is more degeneracy in the case than I have been informed of, and that that has causal bearing."

He was under Dr. B's treatment for several months. Dr. B. saw him every month or six weeks during which time he was sent on a farm. He had a male nurse with him. Here he was no better. The patient states that he had a miserable time on the farm. He slept most of the time on a big sofa and was unable to do any of the help on the farm expected of him. This took us to June, 1924. His respiratory attacks he states were frequent, sometimes 15 or more a day, he had polydipsia and polyuria and was miserable.

Then he had another nurse—a "religious fanatic," the patient called him. His behavior, especially during the trance states that followed his breathing attacks, was quite psychotic; he was obscene, swore and created scenes. These so frightened the nurse that commitment to an institution was suggested. Then the treatment under Dr. B. was terminated and the patient went to reside with a physician. This was unsatisfactory. Then he went to a "boys' camp." Here he had a hard time, he states.

I first saw him the latter part of October, 1924, and here purpose dealing only with certain features of the situation.

The neurological status at this time contained a number of findings not before emphasized. The chief ones are a well marked parkinsonian attitude and progression. For the first three weeks in November, 1924, the patient walked like a dummy with arms drawn up. There is distinct weakness on the right side of the body. A fine tremor, at times both sided, but more marked on the right side; again a hemitremor, right. Kymograph tracings are here presented (reserved for later demonstration). The right palpebral fissure is slightly larger than the left and the left pupil is larger than the right. I reserve details on the CO_2 , pH, and calcium content of the blood, which are in course of investigation.

Without burdening this report with further detailed anamnesis, it may be summarized that this patient developed a mild but distinct post-encephalitic syndrome following the delirium of March, 1922.

augmented after tonsillectomy (ether), the most outstanding features of which are:

- (1) Paroxysmal respiratory episodes, nasal and buccal tics, with trance states, salivation and occasional tetanoid cramps.
- (2) Mild Parkinsonian attitude with slight tremor, more marked on right side.
- (3) Character anomalies.
- (4) Mild "greasy face."
- (5) Polydipsia and polyuria.



FIGURE 1. *Beginning of attack—Puffing 3 minutes, 60 to minute*

Brief discussion will be here offered upon the respiratory attacks and upon the seborrhea. A comment on the tremor is also offered.

I. *The Respiratory Attack.*⁴ The precise steps in its evolution are not altogether clear. Some weeks after the delirium sniffing was noted, and the idea of nasal obstruction became obsessive after the auto accident; these increased and some mouth and nose grimaces began; the full blown respiratory attack is stated by the brother to have begun probably after the tonsillar operation. They have been

⁴This is an abbreviated report of a larger communication upon these respiratory attacks which will contain a digest of the accessible literature.

constant now for at least two years, although they have begun to improve greatly during the past two months.

These respiratory attacks vary in frequency, in duration and in severity, following, in general, the type I of Marie and Levy.⁵

Since I have seen him, a daily record has been requested, and the patient usually says 3-4 attacks, sometimes 2-3, sometimes, "oh! a lot of them." At times he has them off and on all day long. On one occasion only—February 24, 1925—he telephoned me that he had gone all day without an attack.



FIGURE 2. Next 2-3 minutes—facial movements—hands getting stiffer

They seem to start for no ascertainable reason, but certain "complex indicators" have been ascertained. He says that smoking will start them, but observation shows that he seeks a cigarette rather as an effort at mitigating or side-tracking an attack. In other words, the psychical component would utilize both a cigarette and an attack as an outlet for the unconscious displacement.

The attack may be diverted or arrested. There is no certain

⁵ Marie, P., and Levy, G. See thesis of Levy, G., Paris, 1923, and her monograph, *Les Manifestations Tardives de l'Encéphalite Epidemique*, Doin, Paris, 1925, p. 137 et seq.

technique that can guarantee this, but enough has been learned about the unconscious vent to predicate along what lines one could at times supply surrogate outlets for that which lies beneath the attack. Inasmuch as different attacks represent different level discharges of preconscious and unconscious material no adequate diversion technique is likely to master all of this wish material.

A mild attack (high level) discharge will be finished in 4-5 minutes, the breathing will not be over 30-40 to the minute, and there will be no trance state following.



FIGURE 3. Hands in rigid position 5-7 minutes

In a severer attack the puffing becomes deeper and more rapid, the patient becomes definitely anxious, the contortions of the nose, wide dilatation of the nares, protrusion of the lips, etc., increasing fixation of the body, fixed rigid mouth movements, puffing or blowing takes place, the respirations go up to 70 to the minute, the pulse to 100, the hands begin to become cyanotic, and the patient is "feeling rotten," as he may be able to tell you—then the breathing gets more superficial and a cessation of breathing occurs. The parkinsonian rigidity becomes more pronounced; he used to shiver a great deal at this stage—the eyes look off, the pupils dilate somewhat, the face becomes mask-like—the palpebral fissure narrows, the mouth purses up, saliva commences to drivel from the mouth, and in from

10-20 minutes after 3-4-5 minutes of this trance⁶--in which he states his mind is a blank--in which he only "wonders if he will ever get well"--he comes to, smiles, says he has "snapped out of it" and is all right again.

More than half of his attacks are "trance" free--and there is a record in earlier attacks of a partial loss of consciousness and the



FIGURE 4. Ten minutes--trance state, which lasted 2-3 minutes--whole attack about 10 minutes

necessity for lying down in certain of these trance states. He has never fallen in one of them, but almost "goes out," he says.

"Trance" attacks have been recorded without any recognizable antecedent breathing attacks. These were more common during his stay at camp and while on the farm--especially at times when he had a loathing for his male nurse.

⁶ In trance states in earlier periods patient was obscene and even violent. This feature is reserved for further report.

In the earlier periods the breathing attacks were accompanied by tetany-like stiffness in his jaw, his hands, left > right, and occasionally painful cramps in the feet.

One severe attack lasting thirty-five minutes took place during an interview in my office, and was accompanied by what he described as "Jesusly painful" cramps. The hands were not in a typical obstetrical position as in tetany, but were more semigrasping in their nature. He would and could not take hold of something.⁷

These cramp states have been greatly ameliorated during the past two months. Only two or three have occurred in the past two months, whereas as he recollects they were two or more times daily in occurrence and he dreaded them—crying violently from their painful and anxiety producing qualities.

His own memory is somewhat unreliable about these attacks.

Thirst and polyuria are accompaniments of this whole situation.

In the milder trance states one can obtain his attention; he may smile at a joke, answer retardedly in monosyllables, but in others there is no response, although he can repeat phrases, etc., spoken during this period, showing that he is not unconscious. In one or two attacks I have demonstrated a partial hazy consciousness without retention of what was said—quite analogous to certain "hypnoleptic"—"pyknoleptic"—epileptic trance states to which they are undoubtedly definite homologues, differing but little in the unconscious content or even dynamic.

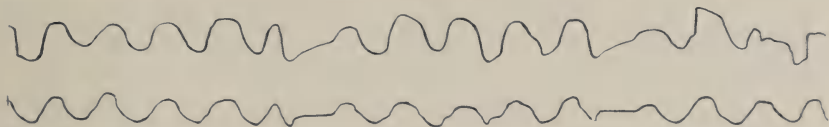
One pneumographic tracing was taken by Dr. Yale Nathanson of the University of Pennsylvania, and I append his notes, as illustrative of a comparatively average severe attack:

"Am forwarding herewith pneumographic record made yesterday, March 22, 1925, of X. The record was begun at 4:26 P.M. and continued until 4:40 P.M. The red line shows intercostal breathing with the pneumograph and body band placed above the nipples; the blue line shows diaphragmatic excursion and the time interval as shown in the bottom line is regulated to 72 per minute. The apparatus used was the Marey tambour with the double edge pneumograph and connecting tubes.

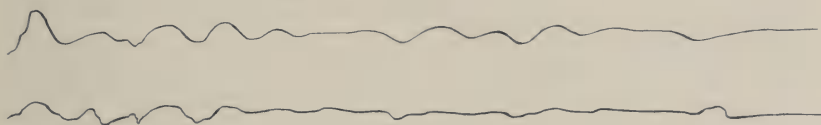
"May I say, before explaining any of the record, that I trust you will appreciate the fact that I am not attempting any interpretation of the record, and where it so seems it is due entirely, let me assure you, to my eagerness to supply you with what information I was able to glean from watching X while taking the record.

⁷ The records concerning electrical excitability, Chvostek, Trousseau and other tetany phenomena are here omitted.

Began at 4:26 P.M., Sunday, March 22, 1925.



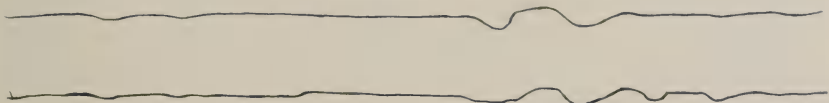
1. Period of rapid breathing—7 minutes.



2. Beginning of apneic phase—3 minutes.



3. Apneic phase—3 minutes.



4. End of apneic phase, resumption of normal breathing.

Ended at 4:40 P.M., Sunday, March 22, 1925.

First line: Intercostal Breathing.

Second line: Diaphragmatic Breathing.

Third line: Time markings at rate of 72 per minute.

"To begin with, while I was preparing the apparatus, he seemed more than interested and told me that he felt he was going to have one of his typical tetanic spells. By the time I placed the pneumographs in position he was breathing quite rapidly, as shown at point 'A,' probably close to 50 or 60 per minute, and talking facetiously, making remarks about the apparatus, the room, etc., just as I have observed in him during these (several) months. He kept apologizing for making these remarks, and assuring him that it was perfectly all right, he continued his rapid breathing as shown by the record. At point 'B' he lessened his conversation but the breathing continued. At point 'C' he assumed a posture of tetany-like rigidity and reached for his pocket for a handkerchief which he held at his mouth for some time. He then maintained this position of absolute quiet, paying no attention to me or the apparatus, standing perfectly quiet and gazing into the far corner of the room, which is a blank wall. During this time, as the record shows, there is practically no breathing and a definite suspension of all activity, a slight cyanosis, about lips and chest. The only movement detectable is a slight twitching of the skin of the chest. He was very cold throughout this part of the procedure, although the room was not uncomfortable. As indicated on the record, he started talking to me and complained of feeling 'groggy.' I tried to engage him in conversation and he discussed the fights which he had seen the night before. His breathing began then and as he requested it I gave him a cigarette.

"After a minute or two he said: 'Well, I'm out of it now. Can you tell it by the record?' At this time his pulse was 96. I had forgotten to take it at any other time, but if you wish it I shall be glad to take a plethysmographic record whenever you say.

"It was quite interesting to me, the long spells of suspended breathing coming, as they do, with the peculiar lapse of attention. They look, indeed, like fatigue reactions following upon the rapid breathing and its attendant exhaustion. The lack of respiration should certainly find a high correlation with lack of oxygenation and general metabolism."

The chief concern of this preliminary communication is with the unconscious factors as throwing some light on the psychopathology. Many of these cases have been reported; some have recovered spontaneously, but in the vast majority of cases there has been a marked chronicity. Hypnosis has seemed to help some cases—one

reported by Runge being of special interest in comparison with this case.⁸

He had a few dreams during the first week but they were not discussed. The first one which seemed to offer a profitable opening is as follows:

Oct. 29, 1924.

Last nite I dreamt I played hookey at C. High School. I had two difficult written lesson to hand in that day. I had them done partly (not efficiently). I did not like to go to school with my work done in a half-assed manner. I was in a candy store about two squares from the school. Incidentally I had already gone to school, hung my winter overcoat and felt hat in my locker at school. At the candy store I met a very dear pal o' mine—J. L. I told him I wanted to "bag." He replied, "I can take the day off without playing hookey, why don't you do the same?" I told I would but I was afraid I'd get Hell from my folks. I also dreamt that I sent J. to school for my coat and hat. I told him to put the coat on over his spring coat and bring it to the candy store and we would go to Phila.

No detailed analysis was made of this first dream, although the pleasure-serving nature of the illness was quite apparent. Its even superficial survey reveals some of the regressive factors.

The discussion regarding playing hookey brought up the practice of loafing in court rooms and certain curiosities regarding criminal acts. It also led to a discussion of the compulsion to stay in bed in the morning, or all day, and the fights with father and brother trying to get him out of bed. The technic of the male members of the family was the usual one of hectoring and badgering. It was the "spare the rod and spoil the child" kind of firmness. This had been the routine when he was on the farm, and many of his most violent, almost katatonic, tantrums had come from the negativistic refusals to get up when the nurse would pull the covers from off his bed and even throw cold water on him. All of this type of thing was of no avail—and I had to tell the father in decided terms to leave the boy alone. "Treat him as if he did not exist and the results would be better." At first the father could not occasionally resist the temptation to use forceful methods, but the regression was so pronounced each time he attempted it that he soon saw it was a destructive rather than a constructive method, and of late he has left the boy much to himself.

⁸ Runge's case report somewhat similar is reserved for a later communication. It is however worth while to state that the hypnotic procedure enabled him to correlate certain factors as "lavierte onanism," i.e., being unconscious masturbatory activities.

Further discussion of this dream brought out the difficulties he had had at school after his delirium and after the summer vacation when he tried to go back to school.

Further dream analyses were quite definite in establishing a transference. The details are omitted from this communication. As I am intending only to bring out certain aspects, I call attention to a very interesting dream of January 7, 1925. The Oedipus situation had been quite adequately demonstrated:

"I was with another fellow—he lives here in New York (my old friend Jerry). First he said let's go to a \$1.00 house. No I said let's go to a cheaper one, a 50 ct. one. So we went. At the door there was a peculiar device to open the turn style type of door, a device like a dial telephone disc, yet it was vase shape in general proportions. We turned it, a bell rang and then we entered by a side entrance. The madame of the house was my aunt, and there were two girls in their undergarments, two beds. Jerry was all there as he took the left hand girl. It took him some minutes and he puffed and grunted and everything (just like I do). I did not do anything. We paid our 50 cents and got out."

This dream scarcely needs any analysis. Its main features are obvious. First the splitting of the patient into himself and Jerry. Previous analyses, as well as association material with this, reveals Jerry as his inferior split off sexuality. It was by Jerry that, from 12–13 years of age, he was first initiated into the delights of mutual masturbation. Jerry also made sodomistic advances and encouragements;⁹ the patient states these did not interest him, but the efforts at seduction of little girls through Jerry's leadership was much in evidence after twelve. The \$1.00 and the \$.50 detail are, I take it, as expressing both the (1) adult and (5) finger method of seeking the female. Jerry as more proficient is the sponsor for the former.

The door device did not altogether show up much more than juvenile efforts at phallic and finger seduction efforts.

The "madam" of the house was his aunt, the mother's sister. She resembles the mother very closely and the displacement is evident. The significance of the psychological motivation of the breathing attack is quite clear. It is a forbidden activity carried out in a substitute manner. A conversion mechanism at the respiratory level.

Asked why he himself in the dream did not go through with it, he said, "Jerry took the prettiest girl. He did not like the other girl's looks."

⁹ Some of this material appears in his trance states where obscene material is evident. This was called "degeneracy" by Dr. B. as reported by the nurse who failed to correlate it with the trance states.

Q. What was wrong? A. "Oh, I don't know—I guess I was sore he took the pretty one."

Q. Yes. A. "The other one had bandy legs."

Q. And. A. "They remind me of someone—I don't know—oh, yes, my uncle has legs just like that! He's my father's brother. Oh—that's funny! Is that father? What does that mean?"

It is possible, therefore, that the father prohibition entered into the inhibition in the dream.

It may not be too hazardous also to state that a part of the psychodynamics of the salivation represents what we know it to represent in many schizophrenics—*i.e.*, an orgasm. This salivation comes on in the trance stage.

I shall hope to give a more detailed study of the mouth movements later, where it is clear that the oral eroticism and its nursing regressive stage is another factor in the salivation just as it is known to be in the schizophrenic.

Dream of January 16, 1925: *Horrible Dream: Dog was biting my damned hand. He was panting like the devil. I could not shake him off—(left hand).*

The masturbatory significance of this dream needs no elucidation. Runge's case may be here compared.

"Was rotten all day in bed after this dream."

January 19, 1925: Following this was able, he said, to read a book of 300 pages. The first time he had been able to concentrate enough to go through a book.

One more dream *apropos* of some of the resistances which arose in the analysis. I shall later develop this phase of the analysis, believing as I do that it throws considerable light upon the tremor component in the Parkinsonian syndrome. I have some similar material drawn from arteriosclerotic Parkinsonian patients and the psychogenesis of both situations, *i.e.*, certain arterioscleroses and certain tremors are suggestively illumined.

March 10, 1925.

Monday Morning.

Dreamt last Nite.

I dreamt Jerry and I were waiting for a train. A cop bumped into Jerry. Jerry hit the cop. The officer grabs Jerry. I stick up for Jerry. The cop (a great big blonde six-footer) grabs me too—by the collar. I cry like a baby. Jerry cries too. He walks us for a while and then takes us into an old shack. In the shack is an old dirty room. In the room is an old Italian couple. In the room next

to it is a young Italian woman. (While the cop is holding me and taking me to the "shack, I am threatening him.") Meanwhile the cop goes to make a phone call in the shack. When he goes I say to Jerry, "Let's beat it." Jerry hesitates for a moment, then agrees. We run into the yard and hide behind a snow bank. At this stage of the dream I wake up.

Here I shall only call attention to the patient's writing where it is quite obvious where he writes, "shack, I am threatening him," there is a most pronounced tremor otherwise missing in the body of the

Monday Morning Dreamt Last Nite

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to it is a young Italian women [While the cop is holding me & taking me to the shacks, I am threatening him] Meanwhile the cop goes to make a phone call in the shack when he goes I say to Jerry "let's beat it" Jerry hesitates for a moment then agrees. We run into the yard I hide behind a snow bank. At this stage of the dream I wakes up.

FIGURE 5

dream. Had I not a lot of confirmatory material illustrative of the repressed sadism connected with the tremor in Parkinson's syndrome I should pass this matter over as too sketchy.

The Greasy Skin. It may be emphasized here, perhaps unnecessarily, that at least two outstanding situations have made the study of the encephalitis outbreak of transcendent importance. The first is the advance made into the analysis of the mechanisms of motion, particularly of those components which have to do with the constant stimuli of gravity and inertia, *i.e.*, the so-called extrapyramidal components, for the simplification of which there has arisen so much literature unnecessary to be here entered into.¹⁰

The second situation involves the flood of light thrown upon the analysis of the mechanisms which are related to the visceral regula-

¹⁰ Compare monographs of Wilson, Lewy, Jacob, Magnus and Kleijn, Hunt and others.

tions as integrated or synthesized in their upper neuronic connections. The new observations concerning vegetative neurology, or the neurology of metabolism, has produced an evolutionary modification of practically all of the old humoral hypotheses, even though the older conceptions will probably linger on for many centuries to come.

It is not my present purpose to discuss in detail the fascinating question of the alteration in the skin activities observed in encephalitis cases. Here are opportunities for research from the vegetative neurological side of far-reaching importance.

One of these situations is that spoken of by various names, as hypersecretion of the fat follicles, salve-like face (*salbengesicht*), oily skin (*salbenhaut*) (*visage huileux*), greasy face, seborrhea, etc. This increased fatty excretion may involve the entire body but implication of the head and face are most striking, perhaps because of the anatomical fact of the greater number of fat follicles in this distribution. Cohn, T.,¹¹ Sarbo,¹² and Stern¹³ called attention to these phenomena early, since which many similar observations have been made and some effort directed towards focusing upon possible psychopathological relations.¹⁴

Deferring a rounded out discussion for other places, I would here state that if we follow the general level hypothesis, first emphasized by H. Jackson, modified as the diaschisis theory of v. Monakow and as more definitely outlined by Jelliffe and White in their "Diseases of the Nervous System," the encephalitic process, according to localized lesions, may bring about a "reduction" of function to earlier levels of adjustment. Older cellular memory processes ["engrams" of Semon], which have been submerged or dissolved or integrated in more recent additions to cellular functionings, come back into prominence because these newer evolutionary effector activities are hindered in their expression—they can no longer be "ekphoriert." The highly evolved receptor apparatus is there to catch the external stimuli. The incoming pathways leading to the possibilities of complex psychical integrations may not or may be (T. Cohn, thalamus) involved, or the outgoing effector function may be hindered

¹¹ Cohn, T. Encephalitis ohne Lethargie während der Grippe epidemie. *Neurol. Zt.*, 1920, 39, p. 260. (Emphasizes possibilities of thalamic pathology. Also see K. Mendel, p. 264, "Ich habe nirgends eine analoge Beobachtung gefunden.")

¹² v. Sarbo, A. Ein Fall von diagnostizierter und durch die Sektion bestätigter Enzephalitis der Linsenkerne. *Neur. Zentbl.*, 1920, 39, p. 498. (Emphasizes Linsenkern pathology, p. 502.)

¹³ Stern, F. Ueber das Salbengesicht bei epidemischen Encephalitis. *Neurol. Zentbl.*, 40, 1921, 64.

¹⁴ Stiefler, G. Die Seborrhoe faciei als ein Symptom der Encephalitis lethargica. *Zeit. f. d. g. N. u. P.*, 73, 1921, 455, and others.

[striatum] after the necessary vegetative integration [cortical], into the "Entelechy" of the individual, has been effected. Just where the breaks may be in this series of reflex arcs is for future analysis, but the conception that somatically as well as psychically there is a partial return of the skin to its intrauterine conditioning is, I believe, valid and may be a useful working conception, call it a fiction, with Vaihinger, an hypothesis, or a theory. At the present point in the argument it is in the "fiction" stage in the building up of a logical chain of causality.

There is (?) additional evidence however, I believe, from the psychological side, which may advance it beyond this fictional stage, for my patient, I believe, presents dream evidence pointing to what in psychoanalytic terms is called the "mutter leib" phantasy; that is, the "return to the womb" wish appears in the *dream*.

Thirdly, the "trance" state, occurring in the course of the respiratory cycle, and even without it, is worthy of special study. I can only indicate that it is chiefly in this stage that the facial suffusion, swelling, and tension, which is to be correlated, in part at least, with the increased activity of the blood vessels, and hence the fat follicles, is most prominent. That other factors can contribute to this seborrhea is to be left open for a detailed discussion.

Here we observe a typical "anxiety state," which I am of the opinion may be correlated with the "Trauma of Birth" conception as outlined by Rank. Special attention may be directed towards the pneumographic tracing, which is evidence bearing upon the return to the "apnoeic" phase in the libido regression—to which generalization as outlined by Staercke I am in thorough agreement.

On the 28th of November the patient had had a hard trip up from Philadelphia. He had an attack of trance in the taxicab, with a great deal of apprehension lest they would hit an elevated train pillar (telephone pole accident factor).

As he came into the office he was all bent over like an old man. I took hold of him while in the outer office and gave him a shake, saying "limber up," and also gave him a mild whack on the back, with a "brace up, etc., admonition." I noted a slight expression of displeasure at this more or less commanding attitude of mine, but we went through the hour until the very end, when I asked him what had come to his mind as I poked him up. He hesitated and then finally blurted out, "*I wanted to say, 'Cut it out—God damn you! I hate you!' You were so like father trying to make me get up in the morning. The G. D. S. O. B.*" He was quite agitated when he left.

On December 1, the next visit, he told me he had had a terrible time. He did not want to come to see me. He did not want to get up in the morning. He had stayed in bed most of the time feeling awful. He had called his mother repeatedly to come and sit on the bed by his side and hold his hands. He had ideas of her death. He was very apprehensive about her. Sunday (November 30) he had stayed in bed all day. He called his mother frequently. He had several trance states, cold hands, contractures, face tight, muscles of mouth all twisted up. Could not sleep until 3. He dreamed a series of fragments:

(1) *I was on a ferryboat with my brother. The boat hit another and started to turn over. I got my coat off ready to jump in. People were running around in great excitement. (I awakened, with my heart pumping fierce in great agony. My heart was almost like it was when I had my delirium.)*

(2) *Down at the dock. A man was drowning. My brother tried to save him and he fell in and I did not jump in for some one else, dragged him out as I was about to go in.*

(3) *I had married a man, somewhat your size. There were a lot of boats and I contemplated going to sea to run away. They were going to ship this man out. Later I was locked up for doing this, but I was free to see my parents. When I was locked up, the "fath"—no the man was there.*

(4) *My little kid sister was in the subway crying. I recall waving my banjo at her and then I ran away as though I were teasing her about the banjo.*

The dream was accompanied by much feeling. His associations with ferryboat caused a great wave of feeling and he put his hand on his heart and could not give any association by reason, he said, of the great pain he felt there.

The dream quite evidently showed not only the Oedipus setting. "He had married a man like me." His mother is a large stout woman, even larger than myself. He had married his mother and was locked up for it—great anxiety, "when he was locked up the "fath"—here he started to say "father," but no, I (*i.e.*, the mother) was there—*i.e.*, the identification of self and father and married to the mother.

The turning over of the ferryboat and the drowning man (also like me: brother and I are about same size and coloring—mother) was equated with drowning with the mother—*i.e.*, the return—to the mother. The details are complicated.

I do not know just how correct I may be in my assumption but I have frequently understood a dream of having intercourse (by symbolic action) with a drunken girl—as return to the mother, just as is well known that men who are impotent with women, unless they are partly drunk, are being held up by the mother-incest taboo. The following dream is offered as material along this line. It occurred in this series December 8:

"I was at a party. There were lots of girls and lots of fellows. I think I was alone. I met one fellow who asked me, 'Where's your girl?' I said I would have brought her but she was drunk. I recall going upstairs and then down again after leaving my coat upstairs."

There were indications from the associations that the girl was an older sister. The man who asked was suggestive of the brother-in-law.

The psychoanalytic equation of up and down stairs = entering into—intercourse (party). "Lots of boys and girls" = much tension. Leaving his coat = "naked" (?). Ergo: Entering naked into the female who was drunk, *i.e.*, "deep in the unconscious"—*i.e.*, antecedent to the "girl" = before the sister = mother. Whether this equating is valid I must leave for a more detailed discussion of the associations.

There were other symbolizations of the regression towards the uterine state which were never as heavily loaded—with libido—as are found in the schizophrenic regressions. They had much similarity to the periodic regressions of the epileptoid states. This is another angle which will also be taken up in connection with this patient elsewhere.

The points of chief value here are the apnoeic phases of regression, the trance, the partly bent position, and the greasy face, as all bearing upon the principle of dissolution of function, or diaschisis, psychologically viewed as the "return to the mother."

The time is not at my disposal here to present all of the dream evidence, but assuming its pertinence for the purposes of a logical construction, then we have three avenues of approach tending to show the validity of the conception of a dissolution of function to an earlier stage of adaptation of which the greasy skin, the trance, and the return to the mother's womb in the dream may be summated. Here we are psychologically concerned with the skin erotism of the uterine period. The greasy state of the fetal skin hardly needs to be recalled.

Hughlings Jackson's idea of the "Unity of Medicine," its modern slogan of study the "organism as a whole," thus permits us to turn aside from the puerile question as to the "functional or organic," "mind or body," nature of the problems involved. Such ideas as "functional and organic" as categories belong to the cradle days of intelligence.

In the conception of release of functions at older and still older levels, no matter how the upper level mechanisms are abrogated (this is a matter of detail), we have a useful monistic working conception that replaces the earlier parallelism of body *vs.* mind—somatic *vs.* functional. The rôle of early conditioned reflex activities, *i.e.*, "wishes" in their psychopathological setting thus comes into relief and can be utilized therapeutically.

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ON THE NATURE OF ABDOMINAL REFLEXES

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In a series of previous papers (1) I endeavored to show that the facts of phylogenetic evolution must be the underlying principles in the analysis of the symptomatology of nervous diseases. My argument may be summarized in the following: The evolution of the nervous system is characterized by the superaddition of new elements to the old ones. In the process of superaddition of new elements the old functional adaptations and their anatomical mechanisms did not entirely disappear but were partly modified, partly reduced to a latent state by the regulating influence of higher, *i.e.*, phylogenetically newer elements. Now some of the nervous syndromies are manifestations of deficiency out of this regulating influence of the higher (phylogenetically new) apparatus on the lower (phylogenetically old) ones. In consequence of this severance of communication between the two systems different as to their phylogenetic antiquity there arises possibilities for the outcroppings of phylogenetically old reactions. These being normally latent become manifest as a result of loss of regulating influence of the "neo-apparatus" on the "paleo-apparatus" of the nervous system.

Thus in some diseases of the nervous system there are conditions for the manifestation of "paleo-reactions," *i.e.*, manners of reactions proper to preceding degrees of evolution. From this point of view some diseases of nervous system may be looked upon as a state of evolutionary regression.

The possibility, or necessity, of analysis of nervous syndromes from the point of view of evolutionary regression has been emphasized long ago by such a great authority in neurology as H. Jackson. In his paper (2) published in 1884 we find the following lines concerning the evolutionary method of analysis of nervous disorders: "I have long thought that we shall be very much helped in our investigations of diseases of the nervous system by considering them as reversals of evolution, that is as dissolutions." The term "dissolution" has been defined by H. Jackson as "the reverse of the process of evolution." "The statement to undergo dissolution," he says,

"is rigidly the equivalent of the statement, to be reduced to a lower level of evolution."

It may be assumed that the reduction of the nervous system to lower stages of evolution must be particularly conspicuous in the lesions of the pyramidal tracts since in lesions of these structures there are severances of communication between the neo-apparatus of the nervous system (cortex) and the paleo-apparatus (spinal cord). When the latter becomes independent from the controlling influences of the cerebral cortex there arises a possibility for manifestation of its own phylogenetically old manners of reaction. In this way pyramidal tract lesions may be looked upon as conditions of dissolution of the nervous system.

In applying the terminology of H. Jackson to our explanation of Babinski's sign, in my previous contributions, I could assert that the appearance of dorsal flexion of the great toe in pyramidal tract lesion is a manifestation of dissolution—a state of reducing the function of the foot from a higher degree of evolution (plantigrade foot) to its lower degree (grasping foot).

In the following pages we intend to apply the evolutionary method to the analysis of the nature of the abdominal reflexes. Taking into consideration the fact that pyramidal lesions bring about a stage of dissolution the very fact of the disappearance of the abdominal reflexes in pyramidal tract lesions might suggest that the abdominal reflexes are most likely phylogenetically new acquisitions. Such an opinion expressed by Bychowsky (3) is supported by many other facts. Thus Bychowsky refers to Dexler's observations that the abdominal reflexes are absent in the domestic animals. This we can substantiate.

As to the ontogenetic development of the abdominal reflexes Fuhrmann (4) notes that they are absent in infants and become constant about the eighth month of life. This statement we also can substantiate. This age being the period of the child's learning to assume the sitting position one cannot help postulating that the abdominal reflexes should have some relation to the erect posture. Such an assumption finds support in our observation that in the cases where, due to some pathological causes, the child does not acquire the function of sitting up and standing, the abdominal reflexes do not develop.

Further evidence of this is supplied by the work of Keith (5). In his inquiries on the evolution of man's posture Keith comes to the conclusion that the muscles of the abdominal wall, especially the transverse muscle, are of great importance in sustaining the viscera

when the body assumes a sitting or standing posture. "The moment we assume a sitting or standing posture there is set going a reflex mechanism which throws the muscles of the belly wall into a state of postural tone." In the opinion of Keith the essential factor in keeping the abdominal viscera is neither mesentery nor a negative pressure under the diaphragm, as it has been hitherto supposed, but the reflex mechanism of the belly wall, its muscles acting like "a living belt which girds the loins." Thus in the opinion of Keith the acquisition of the erect posture and the plantigrade mode of progression in the process of evolution must have been associated with elaboration of a peculiar tone of the belly muscles.

On the basis of these arguments and the foregoing facts as to the phylogenetic and ontogenetic development of abdominal reflexes we may assume that the abdominal reflexes are but a manifestation of the particular tone of the belly wall muscles elaborated in the process of evolution during the period of development of plantigrade primates.

There is still another argument for assuming the existence of a special tone of the belly muscles and its relation to the sustaining of the abdominal viscera. The skin of the belly is the only region in the body where cutaneous reflexes can be elicited. And this is the very same region where the wall of the trunk has no bony support and therefore is particularly liable to yield to the pressure of the viscera. Thus we consider the abdominal reflexes as a manifestation of the above described reflex mechanism of the belly wall muscles.

The abdominal reflexes as such have no special physiological purpose. To avoid misunderstandings I should lay particular stress on this point. In bringing the abdominal reflexes into relation with man's erect posture we do not mean to assert that they have any immediate connection with this function. On the contrary we look upon them as a phenomenon of no direct functional purpose but consider them as a mere manifestation of the existence of a peculiar tone of the belly wall muscles. When this tone is greatly decreased the abdominal reflexes may disappear without any disturbance in the function of sustaining the viscera in the erect posture of the body.

The main inference from the foregoing facts is that the abdominal reflexes are a phylogenetically new adaptation, a "neo-reflex," elaborated in the period of acquiring the erect posture of the body. In lesions of the pyramidal tracts when the nervous system is reduced to a lower degree of evolution the abdominal reflexes like other recent adaptations must become lost or diminished.

In many textbooks of neurology one finds the statement that in

pyramidal tract lesion the cutaneous reflexes are lost or diminished while the deep reflexes are increased. Such a statement is not exact. The disappearance or exaggeration of reflexes in pyramidal tract lesions depends not on their being superficial or deep but on the phylogenetic antiquity of the particular reflex. The abdominal and plantar-flexor reflexes diminish or disappear in pyramidal tract lesion not because they are superficial but because they are phylogenetically new adaptations connected with man's acquisition of the erect posture. In the same way the tendon reflexes of the extremities are increased in pyramidal tract lesions not because they are "deep" but because they are phylogenetically old and therefore directly connected with the "paleo-apparatus" of the nervous system (spinal cord) which, becoming free from the controlling influence of the cortex in pyramidal tract lesion may manifest its own automatic reactions in an increased measure. The arguments for the antiquity of deep reflexes of extremities we presented in a contribution "On the Phylogenetic Origin of Deep Reflexes."

There are other superficial reflexes which show only in the presence of pyramidal tract lesion, are more or less manifest depending upon the degree of the destruction of central nerve fibers. Here belong the "reflexes de defenses" of Babinski or "reflex of spinal automatism." This phenomenon is but a manifestation of the most primitive tendency of the segmental apparatus of the spinal cord to show an automatic, diffuse, motor reaction against a cutaneous irritation. This tendency being as old as the vertebrates themselves the "reflexe de defense" might be called "archeo-reflex." When in the evolution of the nervous system the higher centers of the cerebral cortex acquire a regulating power over the motor reactions of the body this "archeo-reflex" becomes latent and controlled by the higher cerebral centers. In severe lesions of the pyramidal tract there arises a marked degree of dissolution of the nervous system and therewith a condition for the reappearance of a primitive action of the spinal cord in the form of the "defense reflex."

Thus in pyramidal lesion along with the disappearance or diminution of one kind of superficial reflexes (abdominal and plantar-flexor reflexes) there is to be observed an exaggeration of the other kind of superficial reflexes ("defense reflex"). The cause lies in the different age of the two mentioned groups of superficial reflexes.

Likewise the statement as to the exaggeration of deep reflexes in pyramidal lesion cannot be accepted as a general rule. For instance, there is a deep reflex consisting in contraction of the skin of the processus ensiformis on tapping the nipple. This reflex is very easy

to elicit in male adults and in children of both sexes. It was described at first by Hess (6) and explained by him as a reflex of the diaphragm. The fact that the region for eliciting this reflex corresponds to the level of the 4-5 dorsal segments, which have nothing to do with diaphragm, speaks against this view. Nor is it possible to elicit a reflex phenomenon of fourth cervical segment (n. phrenicus) by an irritation of 4-5 dorsal receptors. In our opinion, the Hess reflex is a contraction of the uppermost part of the musculus rectus abdominis caused by a mechanical ("deep") irritation of its tendon fibers inserted on the fifth rib. Such an assumption is in accordance with the anatomical facts, for the upper portion of the musculus rectus abdominis is innervated by the fifth dorsal nerve which is stimulated on eliciting Hess' reflex. The very manner of eliciting the same speaks for its being a deep reflex.

In our clinical studies we paid special attention for many years to this phenomenon and we came to the conclusion that the changes in Hess' reflex are identical with those seen in the abdominal reflexes, *i.e.*, it disappears or diminishes in pyramidal tract lesions. Thus in spite of its being a deep reflex Hess' reflex does not become exaggerated in pyramidal tract lesions.

In my opinion the cause of lack of parallelism between Hess' reflex and the deep reflexes of extremities lies in its being a "neo-reflex." Like the abdominal reflexes Hess' reflex is a manifestation of the "reflex postural mechanism of the belly wall," depending like the abdominal reflexes on the erect posture of man. It is phylogenetically a new adaptation, wherefore in spite of its being a deep reflex it does not become exaggerated but on the contrary abolished in pyramidal lesions.

The foregoing arguments and facts show that the changes in the reflexes in pyramidal tract lesions are determined not by their being deep or superficial but by their phylogenetic antiquity.

In conclusion we might once more emphasize the importance of the evolutionary method in the analysis of the symptoms of organic nerve changes. From it is evident that the anatomical as well as physiological data alone are not always sufficient for elucidation of some clinical phenomena. Their solution may be greatly helped by considering the facts of anthropogenetic evolution.

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EXTENSIVE BRAIN HEMORRHAGE
A STUDY TO DETERMINE THE DURATION OF LIFE AFTER ITS
OCCURRENCE *

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In the routine study of autopsy material in the laboratory of this hospital, we were impressed with the occurrence of a series of severe brain hemorrhages where death had been delayed for days. Curious to know if this was the general rule, we began a review of our cases of extensive brain hemorrhage, covering a period of four years. We were anxious to determine if death had occurred in any of our cases immediately, since apoplexy due to hemorrhage is sometimes given as the cause of sudden death. In our study we took only those cases where the hemorrhage was severe or where it had broken into the ventricles. Only those were selected where the exact time of onset and death were definitely known. In about one-half the cases the onset occurred while in this hospital, so that our findings are fairly accurate.

The following is a brief abstract of the cases which came under our observation, all of them with autopsy:

Case 1, A. B., Age 56, F., B. G. H., No. 1. She had diabetes for some years, for which she was on a strict diet with insulin. Her blood pressure had been slightly over 200 systolic, 110 diastolic, for a long time. On April 17, 1924, she suddenly developed dizziness and in a few moments fell over unconscious, soon passing into deep coma, in which she remained until death, which occurred slightly over one hour later. Autopsy was permitted and it demonstrated a large hemorrhage into the pons, bilaterally. There was also marked general arteriosclerosis.

Case 2, A. S., Age 58, F., B. G. H., No. 2. Previous history in this case showed good health. She was very obese and had some palpable thickening of arteries. Blood pressure was 180 systolic, 80 diastolic. On May 6, 1924, she had severe headache, associated with dizziness. During this attack she suddenly fell unconscious and remained so until death, which

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occurred two hours later. There were signs of right-sided weakness. Wassermann test of the blood was negative. There was albumin in the urine. Autopsy revealed a large hemorrhage into the pons and left crus.

Case 3, H. J., Age 56, F., B. G. H., No. 3. Previous health was good, but she was very obese. On June 6, 1924, she suddenly complained of dizziness and fell over unconscious, which soon passed into deep coma with cyanosis, which continued until her death three hours later. Blood pressure was 150 systolic, 100 diastolic. There was no albumin in the urine, spinal puncture yielded a clear fluid. A positive Babinski was present on the right. Autopsy made soon after death demonstrated a large hemorrhage into the pons and left crus.

Case 4, A. R., Age 67, M., Nos. 22-215. This man had complained of marked fatigue and headaches for some time. There was also a history of cardio-vascular-renal disease. On December 12, 1922, after eating lunch, he suddenly vomited and shortly after lapsed into unconsciousness. Both arms and legs soon became spastic with double ankle clonus and Babinski. The urine showed a trace of albumin; blood Wassermann was negative; spinal fluid was bloody. He had a positive Kernig sign. Blood pressure: 200 systolic, 110 diastolic. He continued in coma to death, five hours after the onset. Autopsy revealed a large intraventricular hemorrhage, involving the basal ganglia on both sides.

Case 5, A. J., Age 40, F., Nos. 24-116. She had complained of severe headaches for a period of two years, with attacks of vertigo and spots before the eyes. On June 18, 1924, she had a sudden attack of right-sided weakness. She soon lapsed into coma, which continued to her death, six hours after onset. Autopsy showed a very obese woman with marked cerebral arteriosclerosis, hemorrhage into the left basal ganglia with rupture into the ventricles, with a small hemorrhage into the pons.

Case 6, H. B., Age 48, F., Nos. 22-142. Four years previously a left hemiparesis occurred suddenly. Following this she improved, but was in poor health and complained of weakness. There was marked arteriosclerosis. On August 7, 1922, she was seized suddenly with weakness of the left side. This was followed soon by unconsciousness, which continued to her death seven hours later. Lumbar puncture revealed bloody spinal fluid. At autopsy it was found she had a large subcortical hemorrhage into the right parieto-temporal lobes, rupturing into the right lateral ventricle.

Case 7, R. M., Age 45, M., Nos. 24-27. Painter. This man had worked with lead for years and is said to have had a left "stroke" some fifteen months before, from which he made a fair recovery. On February 6, 1924, he was taken suddenly with an attack of vomiting, followed shortly by headache. Some hours later he had two general convulsions. He died in coma nine and one-fourth hours after the onset. His blood pressure was 200 systolic, 140 diastolic. There was general arteriosclerosis. Autopsy revealed a large hemorrhage filling the left ventricular system, also an old thrombotic lesion on the right side. (Fig. 1.)

Case 8, C. B., Age 60, M., B. G. H., No. 4. Previous health had been very good. On August 4, 1923, he suddenly became dizzy and was soon unconscious, he remained deeply comatose until death, one day later. There was right-sided weakness with Babinski. Blood pressure was 210 systolic, 100 diastolic. Wassermann of the blood was negative. Spinal fluid was

bloody. Autopsy revealed general arteriosclerosis, with a large hemorrhage into the right basal ganglia, rupturing into the right lateral ventricle.

Case 9, L. G., Age 32, M., Nos. 23-157. Had been complaining of not feeling well for two months prior to onset. There was swelling of the feet and albumin in the urine. On June 27, 1923, he was taken suddenly with left-sided weakness. He soon passed into coma, in which he remained

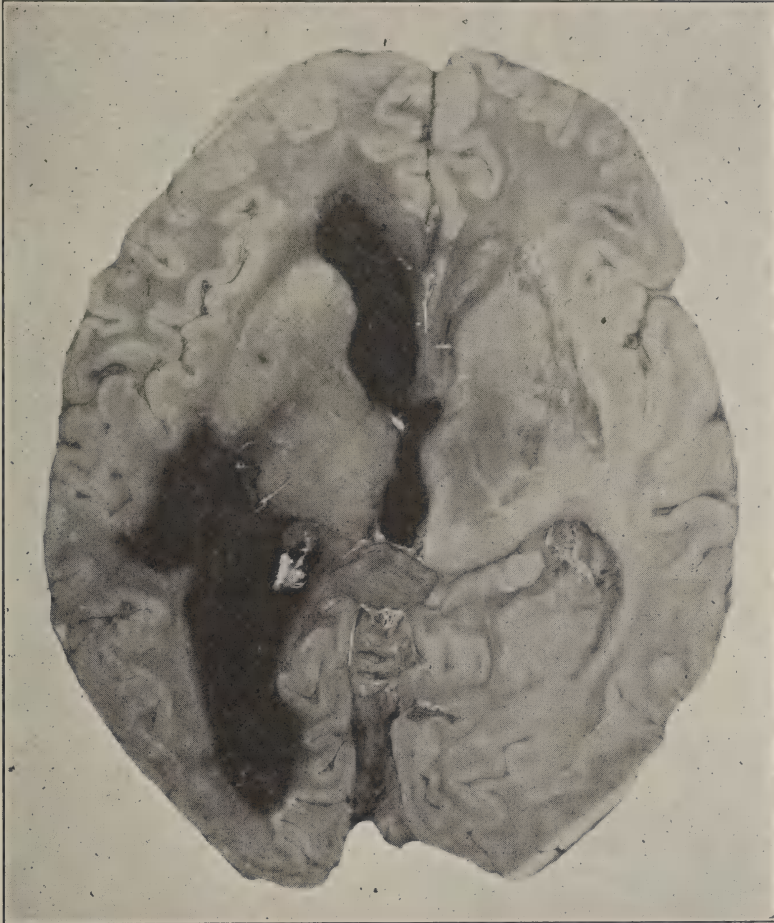


FIG. 1. Left intraventricular hemorrhage. Old thrombotic lesion on right side.

until death, one day later. Blood pressure was 160 systolic, 80 diastolic. Autopsy revealed a large recent hemorrhage into the right parietal lobe, extending to the lenticular nucleus. The ventricles were clear.

Case 10, M. M., Age 60, F., B. G. H., No. 5. Diabetes had been present for a long time, for which she was receiving treatment. On March 7, 1922, she suddenly became dizzy and fell over unconscious. She remained in coma

until death, one day later. Blood pressure was 140 systolic, 70 diastolic. Blood sugar showed 200 mg. per 100 c.c. of blood. There was a 2+ albumin in urine. Blood Wassermann was negative. General arteriosclerosis was evident. Autopsy showed a large intraventricular hemorrhage.

Case 11, J. S., Age 63, M., Nos. 23-272. He had had disturbance of heart and kidneys for years. Nine years previous to admission he had had a partial right hemiplegia with aphasia, which did not entirely clear up. On December 8, 1923, he suddenly became unconscious. The eyes were turned to the right. The left side of body showed spastic contractures. Blood pressure was 170 systolic, 110 diastolic. He continued in coma to death, one day later. Autopsy demonstrated the entire ventricular system filled with blood. The basal ganglia were destroyed. (Fig. 2.)

Case 12, J. W., Age 66, M., Nos. 22-122. He had complained of frequent attacks of dizziness. On June 27, 1922, he suddenly was seized with twitching of the right side, followed shortly by unconsciousness. The right side became flaccid. There was general arteriosclerosis. He remained in a comatose state until death, two days later. Autopsy revealed extensive hemorrhage in the right temporal and parietal lobes, which extended into the basal ganglia. Both lateral ventricles were filled with blood.

Case 13, S. H., Age 75, M., Nos. 23-85. This man had a definite alcoholic history. On March 29, 1923, he suddenly became dizzy and fell over in a stupor, with flaccidity of left side. The right pupil was larger than the left. Laboratory examination of blood, urine and spinal fluid showed no abnormal findings. He continued in coma until death, two days later. Autopsy revealed marked general arteriosclerosis, large hemorrhage in the right parietal lobe and one in the pons, and a small amount of blood in the lateral ventricles.

Case 14, C. H., Age 48, F., Nos. 24-38. She had previously been in good health. On February 17, 1924, suddenly right-sided weakness occurred. This soon passed into coma, which continued to her death, two days later. Blood pressure was 295 systolic, 100 diastolic. She had the physical signs of mitral regurgitation, myocarditis and arteriosclerosis. Autopsy demonstrated a large hemorrhage into the left hemisphere, involving the lenticular nucleus and internal capsule. The ventricles were free.

Case 15, F. R., Age 60, F., Nos. 23-7. Had been in poor health for a number of years. She had had "strokes" one, three and five years before. On January 3, 1923, she suddenly became unconscious and passed into deep coma, which continued to death, two days later. Blood pressure was 225 systolic, 130 diastolic. Blood urea 38 mg. Blood Wassermann was negative. There was general arteriosclerosis. Autopsy revealed a recent large hemorrhage into the right lenticular nucleus and internal capsule and also on the right side of pons.

Case 16, T. G., Age 51, M., Nos. 23-279. Teamster. Previous health had been good. On December 14, 1923, he was taken suddenly with dizziness and headache, which was soon followed by a semiconscious state. Examination revealed weakness on the right side with aphasia. There was no Babinski. Blood pressure 220 systolic, 90 diastolic. Blood urea was 50 mg.; blood Wassermann negative. He had the physical signs of general arteriosclerosis and aortic regurgitation. He died three days after the onset

in coma. Autopsy revealed a large hemorrhage into the right basal ganglia region, with penetration into the lateral ventricle.

Case 17, M. S., Age 47, M., B. G. H., No. 6. Previous health had been very good. On April 6, 1921, he suddenly experienced weakness on the left side of the body, which became flaccid. Shortly after onset he passed into coma, which continued to his death, three days later. Blood pressure: 180 systolic, 90 diastolic; Wassermann of blood and spinal fluid negative.

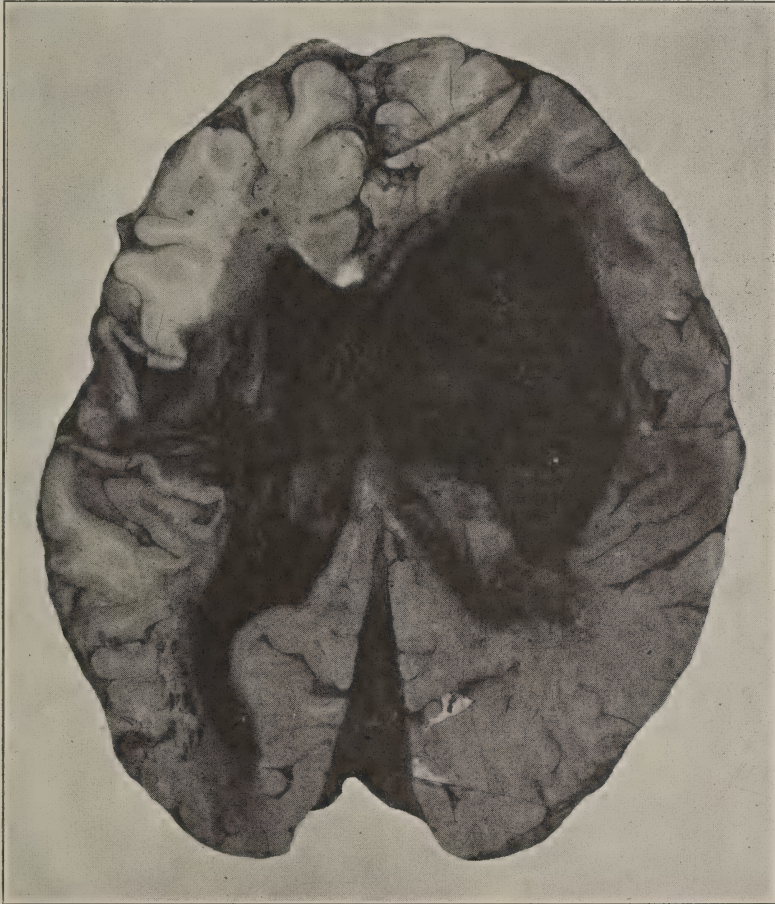


FIG. 2. Large intraventricular hemorrhage with destruction of considerable brain tissue.

The spinal fluid was bloody. There was general arteriosclerosis. Autopsy revealed a massive right cerebral hemorrhage. The ventricles contained a small amount of blood.

Case 18, L. J., Age 66, F., Nos. 22-147. Had been in poor health for some time. Some months previously she complained of slight weakness of

the left side. On August 26, 1922, she suddenly developed a marked left-sided weakness, which was soon followed by disturbance of consciousness. She passed into coma, which continued to death, three days later. Blood pressure was 190 systolic, 100 diastolic. There was a strongly positive Wassermann of blood. Blood urea was 42 mg. There was marked general arteriosclerosis. Autopsy revealed a large, fresh hemorrhage of the right hemisphere, involving the basal ganglia, which had broken into the right lateral ventricle.

Case 19, J. S., Age 77, M., Nos. 22-30. He had been ill with chronic nephritis for a long time, and had had right-sided weakness for two years. On February 9, 1922, he suddenly became cyanotic; later edema of eyes and legs developed; associated with this there was coma, which continued to his death, three days later. Blood pressure: 200 systolic, 100 diastolic. Autopsy revealed general arteriosclerosis, chronic interstitial nephritis, myocarditis, with a large hemorrhage in the left thalamus and internal capsule, breaking into and filling the ventricles.

Case 20, J. S., Age 71, M., Nos. 22-32. Previous health was good. On February 10, 1922, suddenly marked weakness of the right half of the body with aphasia occurred. He then lapsed into coma, which continued to his death, four days later. Blood pressure: 265 systolic, 110 diastolic. There was marked arteriosclerosis. Autopsy revealed a large hemorrhage of the left internal capsule and lenticula, which broke into and filled the left lateral ventricle.

Case 21, A. M., Age 70, F., Nos. 23-88. She had had attacks of severe headache for many years. On March 30, 1923, was awakened suddenly by vomiting, which was soon followed by coma, which continued to her death, four days later. Blood pressure was 195 systolic, 90 diastolic. Wassermann of blood and spinal fluid were negative. Autopsy revealed general arteriosclerosis, hemorrhage of the right lenticular and caudate nuclei, rupturing into the lateral ventricles, filling also the third and fourth ventricles.

Case 22, N. J., Age 51, F., Nos. 21-82. She had been in poor health for five years. On May 24, 1921, she was taken suddenly with weakness of right side, followed by coma. This continued until her death, four days later. There was a right-sided Babinski. Blood pressure: 192 systolic, 100 diastolic. Autopsy showed a large hemorrhage of the left hemisphere, breaking into the lateral ventricle.

Case 23, J. P., Age 66, M., Nos. 22-183. Previous health was good. On October 25, 1922, left-sided weakness occurred suddenly, which was followed by coma, continuing to his death, four days later. There was a Babinski on the left. The heart was enlarged to the left. Blood pressure: 190 systolic, 110 diastolic. Autopsy revealed general arteriosclerosis and a large hemorrhage into the posterior portion of the basal ganglia region, breaking into the ventricles.

Case 24, J. H., Age 60, M., B. G. H., No. 7. Previous health was good. He had been attending regularly to business. On September 18, 1922, he was taken suddenly with left-sided weakness, followed by coma, which continued to his death, five days later. Blood pressure: 180 systolic, 100 diastolic. Blood Wassermann was negative. He showed evidence of arteriosclerosis and chronic nephritis. Autopsy revealed a diffuse hemorrhage in the right basal ganglia rupturing into the lateral ventricles.

Case 25, H. K., Age 58, M., Nos. 23-135. An alcoholic history was

obtained. On May 25, 1923, he was taken suddenly with right hemiplegia, associated with mental clouding. Wassermann of blood was 4+, while the spinal fluid was negative. There was evidence of general arteriosclerosis. Blood pressure: 180 systolic, 100 diastolic. After some days coma set in, which continued to death, six days after onset. Autopsy revealed a large hemorrhage of left thalamus (2 x 8 cm.), which ruptured into the ventricle.

Case 26, M. C., Age 90(?), F., Nos. 22-58. For many months she had complained of dizzy spells, mental confusion and general weakness. On March 13, 1922, there was sudden onset of left-sided weakness. She soon passed into coma, which continued to her death, six days later. There were the physical signs of enlarged heart to the left, mitral murmur, and albumin in the urine. Blood pressure: 185 systolic, 110 diastolic. There was marked arteriosclerosis. Autopsy demonstrated a large hemorrhage into the right thalamus and capsule. The ventricles were filled with blood.

Case 27, L. N., Age 50, F., Nos. 23-176. Tailoress. There was a history of having had general convulsions at frequent intervals for a period of six months. On July 26, 1923, was taken suddenly with right-sided weakness, followed by marked delirium, which later passed into stupor with rigid neck, and double Kernig sign. X-ray of spine and skull was negative. Spinal fluid was bloody. Blood pressure: 202 systolic, 150 diastolic. Stupor passed into coma on fifth day, at which time there was some choking of the discs. She died on seventh day. Autopsy revealed marked arteriosclerosis, a large hemorrhage in the posterior portion of right temporal region, internal capsule and pulvinar, and subdural hemorrhage over the right temporal lobe.

Case 28, M. L., Age 48, F., Nos. 23-239. Five months before she had had weakness of the right side, but had improved markedly. On October 29, 1923, vomiting began. She developed coma in thirty minutes. There was no temperature. Marked weakness of the right side was present. Wassermann of the blood and spinal fluid was negative. Blood pressure: 98 systolic, 65 diastolic. The coma continued to death, seven days later. The blood chemistry was normal. The spinal fluid contained blood. Autopsy revealed general arteriosclerosis and a large intraventricular hemorrhage, also a cortical hemorrhage within left temporal and occipital lobes.

Case 29, A. B., Age 68, F., Nos. 24-51. Previous health was good. On February 29, 1924, she suddenly became unconscious with weakness of the left side. Blood pressure: 260 systolic, 140 diastolic. Blood chemistry was normal. Wassermann of blood and spinal fluid was negative. The reflexes of the left side were exaggerated without Babinski. She died in coma, nine days after the onset. Autopsy revealed general arteriosclerosis, a large hemorrhage in the right hemisphere, which had destroyed the lenticular nucleus.

Case 30, A. H., Age 47, F., Nos. 23-24. Previous health was good. On January 17, 1923, was taken with severe headache and vomiting, followed by convulsions and mental change. There was stiffness of the neck and double Kernig sign. No organic toe signs were present. Blood pressure: 135 systolic, 95 diastolic. The Wassermann of blood and spinal fluid were negative. The spinal fluid contained blood on four punctures. She died fifteen days after onset. Autopsy revealed general arteriosclerosis, chronic myocarditis, interstitial nephritis and marked intraventricular hemorrhage of both sides.

LITERATURE

In reviewing the literature on this subject one finds comparatively little reference given to the time of death after severe brain hemorrhage.

Dana (1), in analyzing a series of cases with either brain softening or hemorrhage, found that cases of ventricular hemorrhage lived from one to three days after the onset, whereas hemorrhage into the brain substance did not cause death until about a week. A mild hemorrhage, in his experience, did not cause death until after three weeks.

Hare (2), in his textbook, states that a large hemorrhage into the brain may cause rapid death, especially so if it occurs into the pons or medulla.

Spiller (3) made a most careful study of thirteen cases with autopsy, and concluded that rapid death did not follow cerebral hemorrhage. He found that ventricular hemorrhages were more rapidly fatal than when they occurred into the cerebral substance. He also found that a large portion of brain tissue might be destroyed and still the patient live for a considerable time. In his series the duration of life varied from a few hours to as long as sixteen days in one case.

Brown (4) believes that cerebral hemorrhage may cause sudden death, but if so, it must be large and occur either into the pons, medulla, or far back in the cerebellum, or a massive one into the ventricles.

Lewandowsky (5) states that if a hemorrhage occurs in the vicinity of the respiratory center into or near the medulla instant death may occur; but in other areas of the brain the patients may live from hours to days. His feeling is that the seriousness of the hemorrhage depends largely on its proximity to the respiratory center.

Cadwalader (6), in a study of cerebral hemorrhage and vascular occlusion, found that sudden death after hemorrhage did not occur, even though the lesion was large. In his series of twenty-four cases only four lived less than one day.

Thomas (7) states that death within one to two hours after cerebral hemorrhage is rare, and quotes the case of Abercrombie, in which the patient died within five minutes, as never having been equaled to date.

Spillsbury (8) found that cerebral hemorrhage was rarely rapid enough to be called a "sudden death cause."

Maloney (9), while coroner of Dublin, published his post-mortem results in a large series of cases of sudden death, and in only one of

this series did the question of cerebral hemorrhage enter, and in this case the man was found dead.

Oppenheim (10) in his book states that death may occur suddenly from hemorrhage, but states the size of the hemorrhage and the breaking into the ventricles are important factors. His belief is that if a hemorrhage occurs into the medulla death is always sudden.

COMMENT

An analysis of our cases shows that in twenty-two of them a hemorrhage occurred either into the ventricles or eventually broke into them. In several of the cases the ventricular hemorrhage was large, and while the most rapid death was five hours after onset (Case 4), in one case the duration of life was fifteen days (Case 30). In only two of our series did convulsions occur (Cases 7 and 30). In another (Case 12) there was muscular twitching on one side, although no definite convulsion. Loss of consciousness was either sudden or developed within a short time after the onset in twenty-three cases, while clouding of consciousness or mild delirium occurred in four more of the cases.

In only four of our cases did the patient remain clear for any time after the onset of the hemorrhage. Hemorrhage into the pons caused death in the shortest period in our series (Case 1). This patient lived but one hour after the onset. In four other cases there was hemorrhage into the pons and into other parts of the brain. One of these cases lived two hours, one for three hours, one for six hours, and one for two days. In one other there was a large hemorrhage at the base, complicating the picture. In every case in this series the onset was sudden.

CONCLUSION

From a study of the series of thirty cases, with autopsy, we feel that cerebral hemorrhage does not cause immediate death, that is, in less than one hour, even when the hemorrhage is into the pons or into the ventricles.

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SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

THE FOUR HUNDRED AND NINETEENTH REGULAR MEETING, MARCH 3, 1925. THE PRESIDENT, DR. I. ABRAHAMSON, PRESIDING

HUMAN EPIDEMIC ENCEPHALITIS IN RABBITS

DR. M. NEUSTAEDTER, DR. W. W. HALA (by invitation) AND
DR. E. J. BANZHAF (by invitation)

[AUTHOR'S ABSTRACT]

There is a wide divergence of opinion among investigators as to the possibility of successful transmission of human epidemic encephalitis to rabbits. Strauss and his associates Doerr and Zdansky, Levaditi and his associates McIntosh, Silberstein and others report positive results. On the other hand Flexner and Amoss, Douglas and Boessermans and van Boeckel have failed to produce the disease in rabbits.

In September, 1924, we received from Doerr of Basel a rabbit brain that was supposed to be successfully infected with human epidemic encephalitis, showing the typical lesions and having been well controlled.

On October 2, 1924, we began our experiments with the suspensions and filtrates of this rabbit brain, and of those rabbits that seemed successfully infected. Following is a summary of the results of our experiments: Of five animals that were injected with suspension, three exhibited characteristic gross and microscopic pathology of encephalitis. One of these rabbits did not show a characteristic pathology. One died on the third day and exhibited a marked meningitis and hemorrhagic encephalitis. Five rabbits were injected with respective filtrates of the various rabbits, and of these, four died and one survived and was well after a month. The pathology of all these rabbits does not show the characteristic perivascular round cell infiltration nor the neuronophagocytosis; but shows focal necrotic areas, perivascular and pericellular spaces dilated, and hemorrhages, a reaction to a toxic state. The antigen prepared from the filtrates gave good results, fixing complement in spinal fluids of patients that were acutely ill with epidemic encephalitis and poliomyelitis. All brain smears made at the time of necropsy showed no visible bacteria.

Cultures made from the brains in glucose broth and veal agar and incubated aerobically and anaerobically for one week remained sterile with the exception of one contaminated with a hay bacillus.

All sections whose pathology was characteristic of encephalitis were stained according to Ziehl-Neelsen's method, and nowhere could we find any Encephalitizoa Cuniculi.

CONCLUSION

We may therefore conclude: That the encephalitis transmitted to the rabbits with the suspensions was produced by a specific virus; that this virus did not pass the Berkfeld filter; and that this virus could not be obtained by ordinary aerobic and anaerobic cultural methods, and was not seen on the stained sections.

Discussion: Dr. J. H. Globus said: The problem is purely one for a bacteriologist. I can only touch upon a few points, particularly those which were brought to light by recent publications as well as by the earlier work on the subject of the transmission of the disease in question to experimental animals. The first experiments were attempted very early in the epidemic of so-called lethargic encephalitis by workers in one of the hospitals of New York City, who have reported the successful transmission of the disease. This work has been confirmed by other laboratories, but also met with a great deal of criticism from other quarters where similar experiments were carried out with negative results. The main objection to the acceptance of the results of the first workers was based on the recent discovery, that experimental animals (rabbits) very often present symptoms and histological changes typical of encephalitis, which, however, in rabbits are due to some protozoan body, encephalozoon, a protozoan disease common in rodents. Thus, it is said, that this condition when unrecognized may lead to wrong conclusions concerning the transmissibility of the disease. It is rather significant that, in spite of this, these same critical investigators have themselves found it possible to obtain a virus and transmit it, so as to produce the disease picture in animals, and to carry this disease picture from one generation to another. Does it not in a way disqualify some of their objections? For the very same investigators, who regard the protozoan infection as a stumbling block in the recognition of the pathological picture in the experimental animal, characterize and describe their results as "typical histological" pictures in experimental animals produced by transmissible virus. At the same time, it is also claimed that the typical disease of acute epidemic encephalitis cannot be transmitted to experimental animals, since the clinical and pathological picture in experimental animals does not correspond to that of human encephalitis. It is rather difficult to accept the criterion, that in order to establish the possibility of transmission of a disease from the human organism to that of the experimental animal, one must establish the very same clinical picture. You cannot expect to produce in a rabbit a true Parkinsonian picture, or the emotional display and facial expression seen in human acute encephalitis. Highly suggestive, nevertheless, is the fact that the same critical observers working with the virus of herpes labialis, which they think bears striking resemblance to the virus of experimental encephalitis, can be transmitted to the experimental animal

and produce a picture which is said to be "typical" of acute epidemic encephalitis. It is true that there is a general feeling among neuropathologists that there is no such a thing as a "typical" histological picture for acute epidemic encephalitis. As a matter of fact, there are several forms and varying degrees in the morphology of the disease. There is the common infiltrative type, passing into the subacute or chronic productive type where the vessels are surrounded by scar tissue; and then again the fulminating serous or hemorrhagic type where there are little or no infiltrations, but where a great deal of destruction had taken place.

There is, however, one point which apparently has not been stressed enough and that is, that acute epidemic encephalitis is a disease which has, for some reason, a selective affinity for a certain part of the brain, for the midbrain. You are familiar with the typical picture as one which shows manifestations indicating involvement of the midbrain, the seat of the extrinsic and intrinsic eye mechanism as well as that of the coördinating centers. This, to my mind, is highly important, for it helps us to separate this disease from another form of inflammatory disease of the central nervous system, anterior poliomyelitis, which is regarded to be very close to the former in its etiology, though in which the causative factors have a selective affinity for other parts of the central nervous system. If we are to reproduce the disease experimentally, not only in the way of producing diffuse adventitial infiltrations or cloudy swelling of the cells, but so as to bring about an inflammatory lesion limited to the midbrain, then we could say that the disease is caused by a virus similar to that which causes acute epidemic encephalitis. So long as we cannot meet this condition, we cannot definitely state that the virus which produces a similar inflammatory lesion, but which is indiscriminate in the selection of the parts of the brain is the same agent as that which causes acute epidemic encephalitis.

Dr. B. Sachs said: A point of great importance is one to which Dr. Globus has referred, and I would be inclined to put it a little more strongly even, and to say that I do not think that any histological picture can be presented as evidence of encephalitic disease transmitted from man to animal, or from animal to man, and for this simple reason, that if you make a careful analysis of the histological pictures that have been presented as characteristic of the experimental form of encephalitis or of poliomyelitis, you will find that the histological pictures are practically the same. The histological picture seems to be evidence of nothing except of some infectious or inflammatory condition. It is evidence of infectious encephalitis, but it does not prove at all the type of infection. One point that Dr. Globus brought out is well taken: if you can produce a midbrain encephalitis exclusively, and take an emulsion of such a brain, and produce the same lesion in the same region in another animal, you could then say that that lesion was the lesion of encephalitis.

The rabbit seems to me to be a rather unfortunate animal to work with, because according to statements made by Flexner and

others, the rabbit appears to be the subject of a good many diseases, and particularly of diseases of the encephalitic type, so that if a rabbit is taken down after any sort of inoculation or injection, it is rather questionable evidence of the transmission of the disease from one animal to another, or from man to an animal. Flexner in one of his very latest statements, in which he summarizes the entire subject in a very judicial way, has come to the conclusion that the whole subject is still ripe for further study and for further discussion; so we can regard Dr. Neustaedter's paper as a contribution to a subject which is still in a state of flux.

Dr. Neustaedter (closing) said: Of course I must agree with everyone when they say that the pathological picture alone is not typical of the disease, because if you show anyone a slide showing perivascular infiltration and neuronophagocytosis, you can say only that there is an inflammatory reaction. That is also true of poliomyelitis, but we must remember that in poliomyelitis when we inject the animal intracerebrally or in the mucosa of the nose, or intraspinally, we invariably get a characteristic lesion in the anterior horns and also in the brain, and the typical clinical picture. In 128 monkeys I used in poliomyelitis with filtrates I never yet had a single exception where I had not produced a typical clinical picture and typical lesions, just as with the suspension.

I cannot accept Dr. Globus's contention that epidemic encephalitis is really a midbrain disease exclusively, nor can I accept the statement that the only symptom we find is the Parkinsonian syndrome. We find almost anything on the calendar. In over 300 cases I have found, just as in neurosyphilis, you can find a clinical picture in accord with the site of the lesion. I do not want to give the impression that I hold the opinion that I have produced human epidemic encephalitis. If the virus is a filterable virus, you should get the same picture with the filtrate as with the suspension, as I have always obtained in poliomyelitis. I was careful to state the truth, that it seems that I have dealt with some specific virus, that it did not pass the filter, and it could not be cultured. The contention of all investigators who have produced the disease in the rabbit from saliva and from the nasopharyngeal discharges seems to be that it is a filterable virus. It is not a protozoan infection. Another point is that I used four different lots of rabbits from the same dealer. I called the attention of Rose that Flexner found in 50 per cent of normal rabbits typical encephalitis lesions, but he claimed not to be able to find the disease in Switzerland in more than 2 per cent. Rosenow showed us his streptococcus infection producing symptoms in rabbits analogous to those of the patients, myoclonus, etc., and nobody else has done it. There is one point here which is of great interest to me, that the antigen of these filtrates has produced positive fixations. This work was very well controlled and done over and over again in cases suffering from encephalitis. I have written Dr. Rose about it, and sent him some slides, and explained the failure of the filtrate. He states that he had similar results, that he has not produced with the filtrate typical histological pictures.

He says that when he has injected a suspension of 1:1000 of these rabbits that did not show the characteristic picture, he has produced an immunity for three months against the virus of herpes, and for that reason he contends that it is epidemic encephalitis. The whole question is a very difficult one, and I believe that all work on it is of value. We cannot be positive either way. I do not say it is not, and I do not say it is.

THE PUPIL IN SOMATIC AND VISCERAL DISORDERS IN ASSOCIATION WITH REFERRED PAIN AND HYPERALGESIA

DR. JOSEPH BYRNE

[AUTHOR'S ABSTRACT]

After section or crushing of one sciatic nerve, the contralateral is the smaller pupil whilst the animal is quiescent, but it at once becomes the larger when the animal is disturbed or in pain. This is the pseudoparadoxical, in contradistinction to the true paradoxical phenomenon. Both of these phenomena follow one-sided injury of the affective system; but the mechanism of the positive (dilatation) phase in each is different, the pseudoparadoxical phenomenon being fundamentally conditioned by hyperfunction of the injured primary affective neurones.

Unilateral experimental lesions below the level of the umbilicus induce the phenomenon in the contralateral eye, whilst unilateral lesions above that level induce it in the homolateral eye. In the abdominal viscera unilateral lesions with reference to the primitive mesenteric attachment evoke the phenomenon in the contralateral eye when the injured viscus receives its primitive afferent nerve supply through nerves that entered the spinal cord preponderately below the 10th or 11th thoracic segment, and in the homolateral eye where the primitive afferent nerve supply preponderately entered the cord above that level. In accordance with this rule, lesions of the secreting portion of one kidney, ovary, or testis evoke the phenomenon in the homolateral eye, whereas unilateral lesions of the conducting system of each of these organs evoke it in the contralateral eye. Lesions of the liver, gall bladder and pancreas gave conflicting or negative results. In man somatic and visceral lesions induce the pseudoparadoxical phenomenon in both of its phases exactly as they do in animals. Lesions in the following sites induce the phenomenon in the homolateral eye: *a*, one lung; *b*, either side of heart; *c*, aorta (left eye); *d*, stomach, duodenum, jejunum (one sided lesion with reference to primitive mesenteric attachment); *e*, spleen (left eye); *f*, kidney cortex, ovary, testis. Unilateral lesions in the following sites induce the phenomenon in the contralateral eye: (1) Appendix caeci, colon, lower ileum; (2) renal pelvis, ureter and bladder; (3) vagina, uterus, one uterine tube; (4) epididymis, ductus deferens, seminal vesicles.

As it is the affective (pain) system of nerves that is concerned in the mechanism of the pseudoparadoxical phenomenon, this latter is naturally associated with conditions of pain and tenderness. This relationship has localizing diagnostic significance in visceral lesions when these evoke referred pain and more or less typical areas of hyperalgesia. The head areas need revision and amending to be available in practice. In all painful lesions the phenomenon is under the examiner's control. Thus in a painful injury of the leg the contralateral is the smaller pupil when the patient is quiescent, and not in pain, but it at once becomes the larger pupil when the patient moves or painful pressure is made upon the injured part. As this reversibility is pathognomonic, we have in the pseudoparadoxical phenomenon an objective sign of pain which is useful not only clinically, but medicolegally, *e.g.*, in the detection of malingerers, etc. In visceral disease the phenomenon, especially when taken in conjunction with referred (reflected) pain and tenderness supplies a valuable corroborative, localizing sign. The author has found it especially useful in differentiating lesions of the secreting system of the kidney, ovary and testicle, from lesions of the duct systems of these organs. He has also found it useful in determining whether a renal calculus has passed and also in catheterization of the ureters. [To appear in full in JOURNAL OF NERVOUS AND MENTAL DISEASE.]¹

Discussion: Dr. Ernst Waldstein (by invitation): This subject has unfortunately been neglected by a large majority of the profession. Yet every one of us, whether a general practitioner or a nerve or an eye specialist, owes a great debt of gratitude to Dr. Byrne for having devoted so many years of thoroughgoing research to the influence of the sympathetic system on the action of the pupils under pathological conditions. Of course most of us, who preserve some interest in scientific research in spite of the exigencies of daily practice, have been familiar with some outstanding facts relating to the connection which exists between the action of the pupils on the one hand and our emotional life, and certain pathological phenomena on the other hand, such as affections localized in the neck, the thorax, or below the diaphragm. Great progress has been made in this direction since the days when Claude Bernard made his first fundamental experiments. I dare say that hardly a week passes in an eye specialist's practice when he does not come across one or two cases of inequality of pupils in patients, when he would least suspect it. In such cases we were inclined to ascribe this phenomenon either to an unequal distribution of light entering the pupils, or to the different angle at which it strikes the retina, bearing in mind the fact that the macular region of the latter reacts much more strongly than the

¹ REFERENCES

1. Byrne, J., *Am. Jour. Physiol.*, 1922, LXI, 93.
2. Byrne, J., *Am. Jour. Physiol.*, 1921, LVI, 113; *idem*, 1922, LXI, 367.
3. Byrne, J., *Am. Jour. Physiol.*, 1923, LXV, 422.

more peripheral parts; also that there seems to be a difference in the pupillokinetic energy of the temporal and nasal half of the retina respectively, and possibly also of that part of the retina which is responsible for the so-called crescent in the field of vision, the last remnant in man in the phylogenetic evolution of the semidecussation of the optic fibers. Another point to be considered is the more or less known influence of the nervus vestibularis. Yet it is felt that only a part of such cases was sufficiently explained by the above mentioned considerations, and up to recently not sufficient material was available to fill the gap. An entirely new light is thrown on many of these apparently misunderstood or half understood pupillar anomalies now that we are in a position to enjoy the fruits of the labor of such distinguished scientists as Dr. Byrne, and use the remarkable results of his work in our daily practice. Dr. Byrne has given the necessary hints which will enable us to arrive at a more distinct diagnosis in cases which up to now have remained very puzzling.

Mr. E. V. Broderick (by invitation) said: Taking Dr. Byrne's work at its face value and assuming that everything stated is absolutely beyond contradiction, I believe that it is a contribution to be appreciated not only by medical men, but also by attorneys. Dr. Byrne has referred in passing to the fact that there are malingerers in our community. There can be no doubt about that. If there was an objective sign as regards pain which the medical man and the legal man could rely on as certain in determining whether there was existing pain, there can be no doubt that it would be a valuable contribution to all classes involved. Dr. Byrne's work as presented tonight indicates that the long sought for and much to be desired sign has been discovered.

On the question of time alone, if the medical man could be certain in diagnosis, and if the attorney in the case could be satisfied that the medical man is right in his diagnosis, the contribution here is valuable. Attorneys representing injured parties and those representing the other party who has to pay out the money are interested in the question of symptoms. I have no doubt that Dr. Byrne's work in the field of law, both leading up to his LL.B. degree and thereafter, as well as his labors in medicine, has been directed by some process of mind to this question of pain, and I believe that the medical profession and the legal profession are both deeply indebted to him for his contribution. Hippocrates and Blackstone find common ground in his great accomplishment.

Dr. Riley (by invitation) asked if Dr. Byrne would kindly explain the difference between the affective and the critical systems a little more clearly.

Dr. I. Abrahamson said: Have you tested a patient by approaching him with a sharp needle, not touching him, but seeing the effect upon each pupil?

Dr. Byrne (closing) said: As regards Dr. Riley's question, the affective system really means the pain system. Certain stimuli are used in the regular sensory tests, viz, superficial affective and super-

ficial critical stimuli, and deep affective and deep critical stimuli. The superficial affective stimuli are pin-pricking, and heat and cold, *e.g.*, above 45° C. and below 25° C. For practical purposes 50 to 55° C. and ice are used in testing the affective (hurt) element in heat and cold. The superficial affective stimuli are therefore pin-pricking, and heat and cold of the degrees mentioned. Deep affective sensibility is tested by pressure—pain by 55° C. and ice in massive application. The superficial critical system is tested with the von Frey hairs (light touch) and with 37 to 39° C. (warmth), and 25 to 27° C. (critical element in cold). The so-called epicritic ranges of heat and cold described by Head are purely arbitrary. Heat is a complex of the simpler elements, warmth and hurt. The deep critical system is studied by testing posture and passive movement and by warmth, 37 to 39° C., and cold, 25 to 27° C. in massive application. In general, it may be said that the affective system mediates the qualitative element (hurt, pleasure, change of state) in any given stimulus and the critical system the quantitative element (postural and spatial recognition, etc.). The two systems are also differentiated by anatomical as well as by physiological characteristics other than those mentioned.

In regard to Dr. Abrahamson's question, any stimulus, psychic or physical, which carries potential noxious value, will elicit the phenomenon.

UNUSUAL TYPES OF SPINAL CORD COMPRESSION

DR. SIMON ROTHENBERG (by invitation)

[AUTHOR'S ABSTRACT]

This paper, on four unusual cases of spinal cord compression, is reported on the difficulties of diagnosis still extant, despite present knowledge of physiology, localization and pathology of the cord lesions, that has been enhanced through modern spinal surgery.

The first case included that of osteomyelitis of the spinal vertebrae with epidural abscess which caused complete compression of the spinal cord, without the usual accompanying symptoms of this disease, and simulated transverse myelitis. There was no temperature present until far advanced in the course of the disease, and the X-ray and blood findings were negative.

The second case was that of spinal cord compression due to *Cysticercus*, the individual being a Jew and an observer of his faith. The symptoms in this case came on insidiously and gave no clue to the nature of the lesion.

The third case was that of a girl of twenty-nine, who had a luetic infection, for which she had been treated for two years, but whose Wassermann was still positive and who had developed a spinal cord compression, producing a partial paralysis of both lower extremities. She was finally diagnosed as having a cord tumor

and upon operation an endothelioma was removed. The patient made a complete recovery.

The fourth case was that of a man twenty-four years old, who had suffered for nine years previously from Hodgkin's disease, and who suddenly developed a compression with flaccid paralysis of both lower extremities and who made a complete recovery after receiving one X-ray treatment.

These unusual cases all seemed to show a rapid development of their symptoms shortly after the onset of the disease, making diagnosis of the respective conditions very difficult.

SPINAL CORD TUMORS

MAX H. WEINBERG, M.D., PITTSBURGH, PA. (by invitation)

[AUTHOR'S ABSTRACT]

Three cases of cord tumors were presented showing unusual features, namely, the symptoms, diagnostic considerations, pathological features, and therapy in case of an inoperable tumor.

The first case was one of hemangioma of the sixth thoracic vertebra in a young man of twenty. He became sick four months before operation. Both the sensory and motor symptoms were not constant for a while, and diagnosis was delayed until a permanent level was established. The tumor was not found at operation; but at autopsy the sixth vertebral body was found to be enlarged, exhibiting a protuberance which pressed on the cord. The eighth thoracic segment was compressed to one-half the size of the cord immediately below and above it. A lantern slide clearly demonstrated this feature. Another slide made from the tumor itself showed it to be composed of cavernous sinuses filled with blood, with but few spicules of bone present.

The second case was that of a cauda equina tumor in a woman of thirty-two. She had been sick for five months before admission. The most striking symptoms were severe pain in the lower back on lying down, causing the patient to spend all her time in a wheel chair for the preceding five months; atrophy and flaccid paralysis of both legs and gluteal regions; and bilateral toe drop. A very distressing symptom was a sensation of extreme coldness of both lower extremities unrelieved by any measures taken to overcome it.

At operation, a large inoperable tumor of the cauda equina was found. Deep X-ray therapy was resorted to and the patient made a complete recovery. One and a half years after the operation she was found to be perfectly well and able to do the housework for a family of five.

The importance of deep X-ray therapy in inoperable tumors was stressed, and similar reported cases were cited, especially from the German literature. The use of this treatment in all inoperable cord tumors was strongly urged. The third case was that of a woman of thirty-seven whose symptoms developed rapidly, within six weeks of admission, commencing with girdle pains which disappeared

within four weeks. The paralysis came on rather quickly and was established in less than five weeks after the onset. She had a complete paraplegia, somewhat more marked on the left side. She had a modified Brown-Séquard syndrome in that the pain and temperature disturbance were more marked on the right side, and the paralysis more marked on the left. The level indicated an extradural tumor at the fourth thoracic segment. The diagnosis was rather difficult on account of the rapid development of the symptoms and the presence of a fairly high temperature, but all signs pointed towards a tumor of the fourth thoracic segment, and the patient was operated upon.

The operative findings explained all the unusual features, as a tuberculoma of the dura was found. The tumor was shelled out easily, and sections showing typical tubercle formation were demonstrated. The patient is making a satisfactory recovery.

The literature dealing with this subject was reviewed, and the rarity of the condition was stressed. Only one similar case was referred to, that reported by Pelz.

The speaker's conclusions were: That cord tumors present many difficulties in diagnosis, necessitating careful study; that there are no absolute criteria to go by in diagnosing this condition; that exploratory laminectomies are justified in doubtful cases; and that deep X-ray therapy is a valuable measure in inoperable tumors of the cord. [Paper to appear in full in THE JOURNAL OF NERVOUS AND MENTAL DISEASE.]

Discussion: Dr. Byron Stookey said: Dr. Rothenberg and Dr. Weinberg are very fortunate in having so unusual a group of cases. The cysticercus is a very rare condition to find in this country, and especially in an involvement of the spinal cord, with symptoms giving rise to those of spinal cord tumor. Endotheliomas in a patient showing a four plus Wassermann are not quite so rare an occurrence. There is no reason why a patient with a four plus Wassermann should not develop a neoplasm, and if after thorough antispecific treatment no improvement has taken place, I see no reason why an exploratory laminectomy should not be performed provided the signs are sufficiently definite. At the Neurological Institute we have had very little experience with radiation, either by X-ray or by radium, in spinal cord tumors. I should think it would be of extreme value in the type of case which Dr. Weinberg has called attention to. It is extremely difficult in tumors of the cauda equina to remove the tumor *in toto*. While these are tumors within the vertebral canal, they are really peripheral nerve tumors, since they involve the peripheral nerves rather than the spinal cord itself. The prognosis, the signs and the symptoms are quite different from those seen in spinal cord compression. Cauda equina tumors have become in our clinic extremely rare. Dr. Elsberg in his earlier work saw quite a few, particularly giant tumors of the cauda equina, and was the first to describe these. However, within the last five years I do not recall seeing more than one such case.

I am very interested in the point to which Dr. Weinberg has called attention in one of his cases, namely, the increase of symptoms after lumbar puncture. I have seen several cases of intramedullary disease made worse by a removal of the spinal fluid, and also one or two cases of suspected spinal cord tumor in which no tumor was found. I have no explanation to offer, but it is a fact which we must consider when we come to evaluate the importance of the accentuation of symptoms after lumbar puncture in spinal cord tumors. However, it remains certainly a sign which should make us suspicious of the presence of compression of the spinal cord.

I think the very rapid onset of the case which Dr. Rothenberg reported certainly pointed to a myelitis, and I do not see how the diagnosis could have been made before it was. However, at the Neurological Institute we have had one or two cases of myelitis with signs of complete obstruction, which have been operated on early and have walked out of the hospital. I recall two such cases; one a myelitis which came on after a curettage. This woman was a patient of Dr. Alfred S. Taylor. She was from Saranac, had tuberculosis, became pregnant, and had an abortion. Following the abortion septicemia developed, and following the septicemia an acute transverse myelitis at the usual level, the thoracic ninth and tenth segments. Just why these segments are more frequently involved we do not know, but transverse myelitis frequently occurs at this level. Sir Victor Horsley called attention to the fact that these segments are more frequently involved in this type of lesion. This case showed a complete transverse myelitis. Dr. Taylor operated on her, and she went out of the hospital very much improved; she is now walking. I did not ever expect to see that patient walk. I operated on another case. This one was a school teacher who had signs of acute transverse myelitis. Her illness began about the tenth day of her honeymoon. We exposed the cord, found it swollen and adherent to the dura. The patient walked out of the hospital a month later. The third case had a similar acute onset and was operated, but she did not improve at all. I think, in view of the improvement in the other cases, that if they are seen early it is perfectly permissible to do an exploration of the cord.

I would like to call attention to the diagnostic procedure which has been used in the last few years more extensively than before, namely, the manometric study of the cerebrospinal fluid. No case of suspected spinal cord tumor can be considered as having been completely studied unless a manometric study has been made as a part of the neurological examination. Certainly in the cases which Dr. Rothenberg mentioned as being confused with spinal cord tumor, some of them could be ruled out by this procedure. In no case of multiple sclerosis have we ever found interruption of the cerebrospinal fluid circulation. This type of case, and also the so-called atrophic cord, which may give rise to neurological signs so similar to spinal cord tumors, can be ruled out by a complete manometric study. It is a very simple procedure. There are certain refinements which we have developed at the Neurological Institute which are perhaps

helpful in determining an incomplete block. Every case of suspected spinal cord tumor must have a manometric study upon the cerebro-spinal fluid. We know that this water-bed is a very delicate system, so delicate that the lightest touch on even one jugular vein will produce a fluid wave and a rise in the manometer. This is a very delicate mechanism, and one which I think we will be able to develop more as time goes on.

I have not had the good fortune to encounter a cysticercus case.

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY.

1. VEGETATIVE NERVOUS SYSTEM.

Oppel, V. A. GANGRENE ARTERITICA SUPRARENALIS. [Lancet, July 15, 1922, No. 5159, p. 116, J. A. M. A.]

In 1921, Oppel suggested that so-called idiopathic gangrene is the result of excessive activity of the suprarenal glands. In *gangrena arteritica suprarenalis* one not infrequently observes a spasm of the arteries causing complete blanching of the fingers—*i.e.*, a spasm up to 100 per cent, with ischemic pains, etc., and this spasm must be ascribed to a comparatively trifling increase in the quantity of epinephrin in the blood of such patients. Oppel asserts that in human pathology, in suprarenal arterial gangrene, the concentrations of epinephrin must be less than 1:100,000,000, for concentrations of approximately 1:80,000,000 cause ischemic paralyses, which, if such concentration were maintained, would rapidly end in gangrene of the limb, and not even of one limb, but of all four simultaneously. Clinically, nothing of the kind is seen. In human pathology, the hyperepinephrinemia assumed to exist only gradually disturbs the nutrition of the arterial walls in the first instance, resulting in a series of pathologic changes in them and in the contained blood. Human hyperepinephrinemia can be detected in an increase of the vasoconstrictor effect of the blood serum of so-called spontaneous gangrene cases. But, in separated ears and fingers, which have lost some of the sensitiveness, the conditions are too rough for the detection of hyperepinephrinemia in the blood plasma. Clinically, the result of treatment of so-called spontaneous gangrene cases by excision of the left suprarenal, on the one hand, and the pathologic anatomic data on the other, support Oppel's thesis.

Crile, Dennis W. RESUSCITATION BY INTRA-CARDIAC INJECTIONS. [Surg. Gyn. & Obs., Dec., 1922.]

Dennis W. Crile records his experiences in the resuscitation of patients who had collapsed under various forms of anesthesia. He recalls the fact that during the war patients who had suffered from severe hemorrhage, did not tolerate grave operations under spinal anesthesia, but that after transfusion of a sufficient volume of blood they were often anesthetized with safety. This was due probably to the lowering of the blood pressure by the relaxation of the muscular tissue

occasioned by the anesthesia. Bearing these considerations in mind, the author employed adrenalin injections with immediate success in five and permanent success in two instances. The first patient was undergoing an operation for resection of the lower lobe of the lung for gangrene. During the progress of this operation the heart's action suddenly ceased. Direct manual massage was applied to the heart. A feeble response only was obtained. Artificial respiration with the use of oxygen was of no avail. Ten cubic centimeters of a 1 in 1,000 solution of adrenalin was injected into the left ventricular cavity. Tracheotomy was then performed and a catheter for the use of oxygen was introduced into the right bronchus. The patient's color improved and the heart began to beat irregularly. Normal rhythm was restored after a second injection of adrenalin. After forty minutes the patient began to breathe and continued to do so until the supply of oxygen failed. Death occurred during a transfusion of blood. In dealing with the other two who died, the author made injections of adrenalin directly into the heart in one case and into the median basilic vein in the other. In the latter case the patient survived for three days, but died of sepsis. Of the two patients who recovered, one received an injection into the basilic vein four minutes after apparent death and the other was injected by direct puncture into the ventricular cavity through the fourth intercostal space five minutes after all signs of cardiac activity had ceased. The author regards this procedure as a substitute for present-day resuscitation measures, but recommends its use only after these have failed.

Foster, Nellis B. RELATION OF HYPERTENSION TO CARDIORENAL DISEASES. [Am. Jl. of Med. Sc., Dec., 1922.]

Nellis B. Foster can find no adequate evidence for belief that hypertension is a predominant factor in the causation of arteriosclerosis. Our present knowledge seems to indicate in a general way that organic change in the kidneys and vessels may arise in diverse manners, the least indefinite of these being through intoxications of infectious origin. There are suggestions that intoxications resulting from abnormal metabolism may have a similar effect. These intoxications produce at first only functional disorders chiefly referable to the nervous system; when persistent, they induce organic changes affecting the blood vessels and kidneys.

Leriche, R. PERIARTERIAL SYMPATHECTOMY. [Presse Méd., Dec. 23, 1922, XXX, No. 102, J. A. M. A.]

Leriche gives the bibliography and technic of his operation. Experiments on animals cannot refute his findings since it seems that the typical changes (contraction of the artery by irritation and a subsequent vasodilation) occur only in man. The periarterial (or arterial) sympathectomy is different from Jaboulay's denudation of arteries with tearing of the nerves. Jaboulay would certainly have noticed the

contraction of the artery during the operation if it had occurred with his method, as it does with Leriche's. He publishes a case of severe arteriosclerosis in which the carotid tore during the operation. Caution is therefore necessary in senile gangrene, and injections of alcohol into the arterial sheath might sometimes be preferable to block the nerve fibers. The operation causes a better peripheral circulation with elevation of arterial pressure and local temperature. It is indicated with impaired peripheral nutrition not of central nervous, vascular or blood origin. The beginning stages of chronic arthritis of peripheral joints might be improved by it, and, indirectly, the functioning of the endocrine glands might be favorably influenced.

Brüning, F. PERIARTERIAL SYMPATHECTOMY. [Deut. med. Woch., XLVIII, No. 47. J. A. M. A.]

Brüning found that the spasm of arteries reaches sometimes up to the axillary artery from the periphery. Jaboulay-Leriche's operation consists in removing the adventitia of the artery for the length of about eight cm. This has to be done as high as possible, to avoid anastomoses. It is indicated in all the vasomotor-trophic neuroses which are accompanied by angiospastic conditions, like acroparesthesias, Raynaud's disease, acroasphyxia, and eventually scleroderma. It is contraindicated in embolic and diabetic gangrene.

Forestier, J. TREATMENT OF VASCULAR SPASMS BY SYMPATHECTOMY. [Prog. Méd., XXXVII, No. 47. J. A. M. A.]

Forestier reviews favorably this field. The operation proved useful on the internal carotid in corneal ulcers due to injuries of the head, on the brachial artery in Raynaud's disease, on the hypogastric in craurosis of the vulva, and on the femoral artery in varicose ulcers. It is useful not only in angiospasm, but also in symptoms due to an over-activity of vasodilators.

Gilbert and Coury. SYMPATHICOTONIA IN TACHYCARDIA. [Bull. d. 1. Soc. Méd. d. Hôp., XLVI, No. 34.]

In this clinical communication the authors report of a syphilitic with mitral insufficiency hypertension and marked skin pigmentation. He had severe paroxysms of tachycardia which are here explained as sympathicotonic on the basis possibly of a syphilitic adenitis.

Claude and Oury. NERVOUS MANIFESTATIONS IN ENDOCARDITIS. [Rev. d. Méd., XXXIX, Nos. 8-9.]

Clinical description of a severe infection with meningeal and endocardial localizations predominating in a young woman twenty-five years of age. The cardiac lesion developed sometime after the appearance of the meningitis which was first thought to be tuberculous. Other symptoms denoting pressure upon the pyramidal tracts, and aphasia was

pronounced. This case and some others cited confirm the existence of malignant endocarditis with symptoms almost exclusively cerebro-meningeal. The spinal fluid findings were negative, but the blood cultures were positive seeming to point to a malignant endocarditis as primary, the cerebro-meningeal complications secondary.

Liebesny and Scheminzy. PLETHYSMOGRAPHY AND THE HEART. [Wien. Arch. f. innere Med., IV, No. 1.]

A clinical study of the heart action by means of the plethysmograph showing typical curves for effort and analogous ones even for the idea of effort, indicating that this instrument must be used with considerable caution if the inferences are to be of value. The study reemphasizes the very intimate and constantly forgotten relationships of the psychical activities upon the vasomotor system.

Engelen, P. BLOOD PRESSURE FINDINGS AFTER BEER DRINKING. [Deutsche med. Woch., XLVIII, No. 34.]

In this study the author determines from observations on ten average individuals that the drinking of one or two bottles of beer exerted no constant effect on either systolic or diastolic blood pressure. (European beer 4-6 per cent was used. Not the castrated American product.)

Zak, E. VASOMOTOR REFLEX FROM THE AORTA. [Wien. Arch. f. inn. Med., IV, Nos. 2-3.]

This study calls attention to a dermatomeral reflex zone resembling in shape the well known bathing suit neck line crescent. Analysis of the cases showed that this half-moon redness was due to aorta reflex activities. He gives the details of thirty cases out of a much larger experience. In fifty-two cases of disease of the aorta, encountered in the last year, this half-moon sign was very pronounced in 28 per cent, but it was absent in a similar proportion, and more or less manifest in the others. Rubbing with a brush brings out the reflex skin phenomenon with aorta disease, even in the absence of the half-moon sign, testifying to local overexcitability of the vessels of the skin of this area.

Kelling, G. GALLSTONES AND MIGRAINE. [Archiv. für Verdauungs-Krankheiten, Vol. XXX, No. 2, p. 59. J. A. M. A.]

Kelling warns that when colic pains return after an operation for gallstones, before a new operation is contemplated the possibility of the disturbances being an abdominal form of migraine must be weighed well. Migraine is frequently found accompanying cholelithiasis. They both develop on the same soil, and obesity is also common in these subjects. Sluggish metabolism of fat seems to be a factor in all; and fat foods and those rich in cholesterolin should be avoided in all, especially eggs, butter and cream. If oil is used in treatment of gallstones it should be oil with the lowest melting point, and it is better

to refrain from it altogether unless the patient is thin. He orders lean meat for obese gallstone patients, to promote the flow of bile, and he has noticed that in many patients a tendency to migraine was improved thereby. He recalls that animals which are carnivorous have to display more ingenuity and patience in obtaining their food than the animals that feed on plants. This and other data cited seem to suggest some connection between the carnivorous mode of life and the development of the brain. Lean meat in the diet seemed to have a favorable influence in many cases of migraine and stomach disturbances of the migraine type, and in cases of brain fag. He noted this particularly in working girls who spend their wages on clothes instead of nourishing food.

2. ENDOCRINOPATHIES.

Büchler, P. HYPOPHYSIS AND DIENCEPHALON. [Zschr. f. d. ges. Neur. u. Psych., Vol. LXXX, Nos. 1-4.]

Büchler discusses in the light of a series of cases reported the various possibilities as to the origin of hypophyseal symptoms. He believes that they must depend upon interaction between the hypophysis and the diencephalon. Still they may be conditioned also by pluriglandular disturbances. At any rate there will be somatic symptoms or even purely "functional" ones.

Dudley, H. W. ACTIVE PRINCIPLES OF PITUITARY GLAND. [Jl. of Pharm. and Ex. Ther., XXI, 77-151, J. A. M. A.]

An attempt has been made by Dudley to effect a purification of the oxytocic principle of the posterior lobe of the pituitary gland. A crystalline picrate was obtained which had the characteristic actions of pituitary extracts on plain muscle and blood pressure. It had an activity of the same order as that of histamin. It was found to be the picrate of an inert substance merely contaminated with small amounts of the pituitary principles and was eventually identified as potassium creatinin picrate. Out of the mother liquor from the recrystallization of this potassium creatinin picrate a small alcohol soluble residue was obtained. This yielded an acetone insoluble *A* and an acetone soluble *R* fraction. *A* had an oxytocic activity equal to about twelve times that of histamin (reckoned as base), producing a definite contraction of the uterus in a dilution of 1:1,250,000,000. *A* also contained a pressor principle, displaying no preliminary depressor activity. It produced a strong rise of blood pressure in a dose of 0.1 mg. *R*. had one-twentieth the oxytocic activity of *A*, and in doses of 0.5 mg., produced a strong depressor action followed by a moderate pressor action on the blood pressure. Evidence is put forward to show that the oxytocic and pressor principles of *A* are two separate chemical substances, and that the pressor principles of *A* and *R* are most probably also two distinct chemical entities. It is considered, therefore, that there is valid evidence for the presence

of at least three different physiologically active principles in pituitary extracts. This view is in direct conflict with that of Abel and Rouiller.

Tucker. RECOVERY FROM DIABETES INSIPIDUS. [Amer. Journ. Med. Sciences, May, 1922.]

This clinical contribution is a case of recovery from early diabetes insipidus after lumbar puncture. The patient was twenty-seven year old male with marked polyuria and thirst. He complained of marked sweating and of a dry feeling behind the bridge of the nose, which he associated with the cause of his thirst. Personal and family histories were negative, physical examination showed lungs, heart, blood pressure, reflexes, and glandular systems normal, and the sella turcica was normal to X-rays. Subjective symptoms pointed to involvement of the first, second, fifth, and eighth cranial nerves, and urinary analysis showed an output of 4,100 c.cm. in fifteen hours, specific gravity 1,005, no albumin, and no sugar. Following removal of 8 c.cm. clear spinal fluid under normal pressure the profuse sweating ceased, and the urinary output dropped to 406 c.cm. in twenty-four hours, and the specific gravity rose to, and remained at, 1,026 to 1,030, while the fluid intake became 1,200 c.cm., as compared with 5,970 c.cm. before lumbar puncture. Five and a half months later examination was negative except for evidence of hypopituitarism, as shown by a very high sugar tolerance. It would appear that the condition was the result of a serous meningitis with edema of the infundibulum cerebri and involvement of certain left cranial nerves, pointing to the fact that anything causing obstruction to the flow of normal pituitary secretion, such as transient edema, inflammatory exudate, or in increased intracranial pressure, may, apart from destructive lesions of the gland, set up diabetes insipidus, and every case should be given the chance of early relief by lumbar puncture.

Roggen, A. MYXEDEMA AND PITUITARY. [Jahr. f. Kind., Jan., 1923, C, Nos. 5-6.]

In this pathological research the author failed to find any constant signs of changes of the pituitary in congenital or acquired deficiencies of the thyroid gland. When the loss of the functioning of the thyroid is gradual, changes in the pituitary may be found with some degree of constancy.

Perrin, Hanns and Stefanovitch. HEMOSTATIC ACTION OF PITUITARY EXTRACT. [Paris Méd., March 10, 1923.]

The action of posterior pituitary extract on blood coagulation, blood pressure, and pulse rate in ten patients suffering from miscellaneous disorders, independently of actual hemorrhage is here studied. One to two mls of the preparation were injected intravenously. In eight cases the coagulation time was more or less markedly shortened, in one case unaffected, and in a case of purpura, lengthened. The effect on blood

pressure was less constant. In four cases it was lowered by fifteen to twenty millimeters of mercury and in two by thirty to forty millimeters. The reduction of pressure began in ten minutes to one hour after the injection and persisted for two to five hours or longer. The extent of reduction did not parallel the dose injected. In the remaining four cases the blood pressure was unaffected. The pulse rate was unchanged in five cases; in three it was slightly lowered; in one it dropped from eighty to forty, and in one it was increased. The actions on the pulse rate and blood pressure seemed to be independent, as the case with greatest pressure reduction showed no change of rate and the one with greatest pulse lowering showed no reduction of pressure. The hemostatic action of pituitary extract appears to be mainly due to its action on blood coagulation.

Léopold-Lévi. MINOR PITUITARY SYNDROMES. [Médecine, Feb., 1923, J. A. M. A.]

Léopold-Lévi surveys the conditions which may be due to exaggerated or deficient functioning of the pituitary gland. They represent, in miniature, the great syndromes: Acromegaly, gigantism, dwarfism, pituitary infantilism and the adiposogenital dystrophy, but they are often only transitory. The same subject may present several of them at the same time. He discusses the time of onset and gives a synopsis of these symptoms. Hereditary or acquired syphilis is an important etiologic factor.

Drummond, J. C., and Cannan, R. R. TETHELIN. [Biochem. J., XVI, 53, Med. Sc.]

The suggestion has been made that the pituitary body supplied the hormone which regulated the growth of the body, particularly of the skeleton, and Robertson has claimed that the feeding of the fresh anterior lobe of the ox to white mice leads to a marked retardation of growth beginning in six to ten weeks after birth, followed by a pronounced acceleration during the twentieth to sixtieth week. He isolated a substance to which he gave the name of "tethelin," and which he regards as the active growth-controlling principle. The authors found that "tethelin" is a very impure mixture of substances of the lipoid class. They criticize the conclusion of Robertson on the effect of "tethelin" and of anterior lobe upon growth, and report experiments which failed to point to any influence upon growth produced by oral administration of anterior lobe to the pituitary gland.

Cross, Ernest S. CLINICAL STUDY OF A PATIENT SUFFERING FROM INTENSE THIRST AND POLYURIA. [Endocrinology, Vol. VI, No. 3, p. 387.]

The author reports the case of a woman of fifty-eight years who had developed intense thirst and polyuria. There was anorexia, nausea

and peculiar morning vomiting, and in addition marked disability of the spine, together with great loss of weight and strength. A malignant process had been feared, but none had been found in spite of careful examination.

The patient's left breast had been removed ten years before for supposed cancer. Further study of the case showed that the polyuria could be controlled by injections of pituitrin. X-ray studies of the skull showed normal paranasal sinuses and a normal sella. Scattered through the cranial bones, however, there were rarefied areas of bone destruction with no evidence of new bone formation. Apparently, the process was invasive and it suggested malignancy. The patient died about two weeks later with symptoms suggesting increased intracranial pressure. The author regards the case as one of multiple malignant metastases in the bones of the skull at the base of the brain and probably also in the lumbar spine. It is probable that the involvement of the base of the brain affected the mechanism regulating water metabolism resulting in symptoms of mild diabetes insipidus. The origin of the metastases is uncertain, but it is possible that they were secondary to the breast cancer removed ten years before. [Author's Abstract.]

Lisser, H. HYPOPITUITARISM. [Endocrinology, Vol. VI, Jan.]

The author here claims that some practitioners base their clinical diagnoses of disorders of the pituitary gland on the evidence contained in skiagrams of the skull showing either an enlarged or an abnormally small sella turcica. It does not follow that a normal-sized sella turcica excludes the probability of pituitary disease being present; nor does it follow that increased secretion necessitates an enlarged gland or diminished secretion an anatomically small gland. Functional excess or insufficiency can result from a gland of any size, whether large, small or normal. The signs and symptoms of hypopituitarism group themselves into a few readily recognized syndromes as follows: (1) The Levi-Lorain type of pituitary infantilism. (2) The Fröhlich type of dystrophia adiposo-genitalis. (3) The rare Neurath-Cushing variety. The Lorain picture is that of skeletal undergrowth with genital aplasia, but without adiposity; the Fröhlich, skeletal undergrowth with genital aplasia and adiposity; Neurath-Cushing, skeletal overgrowth with genital aplasia and adiposity.

Lereboullet, P. RÔLE OF THE PITUITARY AND THE PINEAL BODIES IN INFANTILE DYSTROPHY. [Paris Letter, Aug. 4, 1922, J. A. M. A.]

This author reviews the so-called hypohyseal syndromes. Among these, the syndromes of osseous dystrophy (acromegaly, gigantism, nanism) appear to be directly associated with changes of the pituitary body. These changes are doubtless brought about, at least to a great extent, by a tumor-like growth (adenoma with eosinophil cells). Hutinel's dystrophy of adolescence would seem to come under this same head.

The adiposogenital syndrome, whether associated with nanism or giantism, seems to be not so much the result of functional alteration of the pituitary gland (as was believed for some time) as it is of the simultaneous (or isolated) involvement of the tubero-infundibular region adjacent. So-called hypophysial obesity is open to the same criticism, and appears often more the result of nerve lesions (whether associated or not with ventricular hydrocephalus) than of functional changes in the posterior lobe of the hypophysis. It is also often partly dominated by concomitant genital changes. Recent symptoms of postencephalitic obesity and of obesity associated with hydrocephalus may be better understood under the foregoing assumption than by invoking a hypophysial lesion. The polyuria of diabetes insipidus should be referred to changes in the tuber cinereum, but this syndrome is also frequently an indication of changes in the pituitary body.

In the examination of these cases we should, therefore, continue to look for changes in the hypophysis, and especially for indications of a tumor. But, at the same time, we should not lose sight of the importance of nerve changes, and whenever possible, especially if syphilis has preceded, endeavor to discover any involvement of the basilar membrane and adjacent centers.

Therapeutic considerations will continue, therefore, to take careful account of a possible hypophysial origin of these syndromes, since surgery (hypophysectomy and sellar trephination) and roentgenotherapy may be credited, at the present time, with unquestionably successful results, and since, on the other hand, hypophysial organotherapy, even though, as it would seem, it does not show the mechanism of true organotherapy, exerts a remarkable effect on a great number of symptoms; more particularly, polyuria.

Blumberg. ROENTGEN IRRADIATION FOR HYPOPHYSEAL TUMORS. [Münch. med. Woch., Vol. LXIX, No. 20, p. 739.]

A therapeutic study in which mesothorium irradiation to the hypophysis was tried in four cases. One was an hypophyseal tumor. The result was very satisfactory. Three other cases were of dysmenorrhea, presumably of hypophysial origin, in two of which considerable improvement was effected, while in the third case no effect was noticeable. He applies the mesothorium to the roof of the cavum pharyngonasale, as the most accessible point in close proximity to the hypophysis.

Kontschalowsky, M., and Eisenstein, A. PITUITARY TUMORS. [Deut. med. Woche., Vol. XLVIII, No. 22, p. 722.]

Operative removal of tumors of the hypophysis result still in a very high mortality, recurrences are common, hence roentgen irradiation, which is not dangerous is to be recommended since it usually gives good results. Only in cases in which roentgen irradiation proves useless

(mostly colloidal cysts) and the eye symptoms and the severe headaches become alarming should an operation be undertaken as a last resort.

Vendel, S. N. PITUITRIN IN THE TREATMENT OF HERPES ZOSTER. [Ugeskrift for Laeger, March 29, 1923, p. 222.]

This clinical therapeutic paper deals with the treatment of eighteen cases of herpes zoster undertaken since 1915. Every second case was given the usual local and symptomatic treatment, while the remaining nine cases were given subcutaneous injections of 1 c.cm. or less of pituitrin. The difference in the results of treatment in the two classes was very striking. In the first class the disease ran its characteristic and painful course. In the second class the injection of pituitrin was followed in a few hours by almost complete disappearance of the pain, and in a few days by the disappearance of the eruption. By the second or third day the patient felt a little more sensitive to heat and cold than usual, but he felt otherwise well. In all these cases the origin of the herpes was spontaneous, and in none were there signs of gross changes in the central nervous system to which the herpes might be traced. The author did not venture to give pituitrin when the herpes was complicated by pregnancy, high blood pressure, or advanced age, and as the injections were apt to cause slight malaise, he took the precaution to keep the patients lying down for fifteen to twenty minutes after an injection. He does not state how he came to think of giving pituitrin in such cases, and he does not discuss its rationale, but he urges his colleagues to investigate further a procedure which may prove an advance on the rather negative and symptomatic treatment hitherto recommended for herpes zoster.

Serdinkoff, M. G. INFLUENCE OF PITUITARY ON BLADDER. [Riforma Medica, Vol. XXXVIII, No. 18, p. 413.]

A clinical report of a striking relief offered by two injections of pituitary extract in a case of retention of urine from paresis of the bladder secondary to pyelonephritis from metritis in a woman of thirty-two. Spontaneous micturition had been impossible for thirty-five days. The bladder had been enormously distended before the retention was recognized, and the paresis had developed the seventh day of the retention. She had had a similar attack of retention of urine three years before with cystitis, and there was a history of three or four abortions without appreciable cause. The tonus of the smooth muscle of both uterus and bladder was evidently modified.

Bailey and Bremer. EXPERIMENTAL RESEARCHES ON DIABETES INSIPIDUS. [C. R. Soc. Biol., May 6, 1922.]

This series of twenty-four experiments on dogs, in which puncture of the hypothalamic area was performed by the temporal route was to test of the relative importance of the glandular or nervous hypotheses.

They find that as a result of even the smallest puncture polyuria sets in in the course of a day or two; it is characterized by all the properties of that seen in diabetes insipidus in the human being—namely, the power of renal concentration under conditions of deprivation of water, fever, and injection of pituitrin, the diuretic effect of chlorides, and the failure of action of theobromine. If the lesion produced be somewhat more extensive cachexia may set in, accompanied by genital atrophy and adiposity. Moreover, they find that the polyuria is independent of the nerve supply of the kidney; in fact, all the nerves to this organ may be cut without preventing the onset of the condition or of arresting it once it has set in. If this be so it is difficult to understand how the effect is produced as a result of a simple lesion of the brain tissue; they are quite emphatic, however, in denying the possibility of its association with the pituitary body.

Waldorf, C. P. PITUITARY AND INTER-BRAIN. [Prens. Méd. Arg., IX, No. 13. J. A. M. A.]

Waldorf describes in minute detail some cases of adiposis dolorosa, obesity, diabetes, etc., in which the combinations and course throw light on the etiology, pathogenesis and treatment, as he explains. His conclusion is that all these diseases need revision from the standpoint of their origin. Excessive or deficient functioning of the pituitary alone is responsible only for acromegaly, giant or dwarf growth, microsomias and nanosomias. The centers in the interbrain or thalamencephalon are probably responsible for polyphagia, adiposis dolorosa and other forms of obesity, diabetes insipidus, glycosuria, dystrophia, somnolency and fever for which the pituitary has been incriminated hitherto. There seems to be some connection between the internal secretion of the pituitary and the thalamencephalon, as is evidenced in the benefit from pituitary treatment in diabetes insipidus, but no such benefit is apparent in adiposis and glycosuria of the alleged pituitary type.

Sainton, P., and Schulmann, È. PITUITARY TUMOR. [L'Encephale, XVII, No. 9.]

In this clinical report a patient was treated for pituitary tumor by X-rays and lived for fourteen years: Not unusual in that many slowly developing acromegalics live longer than this.

Camus, Jean, and Roussy, Gustave. THE PITUITARY GLAND AND ITS SYNDROMES. [Rev. Neur., June, 1922.]

A series of experiments on the pituitary gland of one hundred and forty-nine dogs and thirty-six cats is here discussed. On the question whether the pituitary gland is essential to life, as believed by Paulesco, Cushing and Biedl, the authors can show many animals which have permanently survived destruction of the gland. They maintain that when death does occur in animals that have been operated on, it is due, not

to loss of the gland, but to meningitis or hemorrhage or lesion of the third ventricle. They also hold that it is injury to extra-pituitary parts which accounts for *diabetes insipidus* and glycosuria, modification of carbohydrate tolerance, interference with genital functions, obesity and skeletal alterations. They draw attention to the therapeutic uselessness of pituitary administration in patients suffering from acromegaly and infantilism and to the fact that, although pituitary medication may reduce polyuria, so also may injections of antipyrine, novocaine and other substances. They point out that anatomical study of the *tuber cinereum* and *hypothalamus*, i.e., parts immediately above the pituitary gland, reveals certain hitherto unrecognized nuclei or groups of nerve cells which seem to be of fundamental importance. Thus, Percival Bailey and Bremer are quoted as showing that experimental damage of these nuclei alone in dogs has induced both polyuria and a cachexia akin to the adiposo-genital syndrome of men. They record the findings in *post mortem* examinations of two human instances of *diabetes insipidus*, one associated with past meningitis and the other with abscess, which show the presence of lesions of the *infundibulum* and *tuber cinereum* with intact pituitary.

II. SENSORI-MOTOR NEUROLOGY.

1. CRANIAL NERVES.

Villard, H. OPTIC NEURITIS OF DENTAL ORIGIN. [Bull. Soc. d. Sci. Med. et Biol. de Montpellier, Jan. 1923, p. 126, B. M. J.]

The connection between dental and ophthalmic pathology has been closely studied of late, and some ophthalmic surgeons think that dental disease is the cause of a large number of eye diseases—for example, iritis, retinal hemorrhages, optic neuritis, and even of detachment of the retina and glaucoma. Villard describes the case of a woman, aged thirty-four, whose general health was very good, but who complained of rapid deterioration of vision in the right eye; examination showed a typical retrobulbar neuritis. The left fundus was normal. Villard could find no probable cause for the neuritis, except the unhealthy state of the teeth, especially in the right upper jaw. The patient was sent to a dentist, who extracted all the septic or suspected teeth and roots. In two days the vision became almost normal, and in three weeks the right visual acuity was greater than that of the left eye. Villard concludes that in certain exceptional cases dental infection is the direct cause of retrobulbar neuritis, and that extraction of the diseased teeth produces a rapid improvement and ultimate cure of the optic neuritis. Carrère, commenting on this case, related that of a woman, aged fifty, whose visual acuity (left) was seriously impaired, with a central scotoma for white and colors. No cause for the acute retrobulbar neuritis could be found, except that the patient wore a denture over a number of very carious roots, and

before this optic neuritis occurred the patient had had dental neuralgia, and had had the most severely infected roots extracted. This did not relieve the pain nor improve the vision. However, in eight days there was a marked improvement, and ultimately the vision in the left eye was completely restored. Carrère considers that no other explanation of these cases is possible than that they are of dental origin.

Green, Edridge. THE THEORY OF VISION. [Royal Society Proceedings, Vol. 763 *et al.* Ed. B. M. J.]

In a paper read a short time ago before the Royal Society of Arts Dr. F. W. Edridge-Green contested the orthodox theory of vision put forward by von Kries and others, and very widely accepted, which supposes that the rods in the retina are sensory cells like the cones, and that, whereas the cones are used in the daytime for the appreciation of color, the rods are used at night, when the light is so dim that color cannot be appreciated. Dr. Edridge-Green disagreed with this duplex theory, as it is called, and held that there was no evidence that the rods are sensory. He maintained that they are accessory and are the sensitizers of the cones, secreting the visual purple which is changed by light. There was, he thought, good reason to believe that the means by which light stimulated the nerve endings was through a photochemical reaction; the decomposition of a photochemical film, sensitized by the visual purple, stimulated the ends of the cones, and a visual impulse was set up which was conveyed through the optic nerve fibers to the brain. He maintained that the function of the rods was to regulate the supply of visual purple to the film in accordance with the amount of light falling upon the eye, and expressed the opinion that this theory of vision not only explained all the known phenomena, but enabled various other facts to be predicted. The theory which supposed the rods to be percipient elements for perception in dim light, while the cones were the percipient elements in daylight, he believed to be irrational, for it was difficult to conceive an element stimulated by the decomposition of a photochemical substance which was excited by weak light and not more strongly excited by a brighter light. This theory was supported by what he described as misstatements. One of these was that certain animals had only cones and others only rods; he had made numerous examinations but had never found any animal with only cones or only rods. The creature which was most commonly said to have cones only was the tortoise, but the rods in the retina of the tortoise were as clearly defined and distinct as in the human retina. It was also said that the periphery of the retina was color-blind; this was not the case when colors of sufficient intensity were used, as anyone could test for himself with a red lamp, which he would find could be seen as red to the extreme periphery. The statement that the eye was totally color-blind in dark adaptation was also ill-founded, as was proved in a masterly paper Burch had communicated to

the Royal Society (*Proceedings*, vol. 763, p. 199). Yet another misstatement was that the Purkinje phenomenon and the recurrent image were not found at the fovea. Altogether it was difficult to comprehend how vision could occur on this theory. How were the central connections in the brain arranged in order to obtain localization, with a large scotoma in the most important part of the field of vision? Professor E. H. Starling, who presided, said that Dr. Edridge-Green's theory was consistent with known physiological facts, and was therefore worthy of thorough investigation. The orthodox theory was brought forward with great authority by men of the intellectual magnitude of von Kries and others, but its weight of authority was really a disadvantage, because it caused the theory to be accepted unquestioningly. All such theories should be divested of the authority of the men who gave them birth and the facts regarded *de novo*. By physiological facts he meant such as could be observed sometimes on animals, more often on oneself.

Gifford, Sanford R. NEWER VIEWS IN THE TREATMENT OF OPTIC ATROPHY. [Nebraska State Medical Journal, VII, p. 408.]

Our views of the practicability of any form of treatment in syphilitic optic atrophy depends on whether or not we believe that an active syphilitic process is involved. Stargardt, in the most complete investigation of the subject to date, seems to have proved that this is the case, for in all the cases he examined (21) he found evidences of active syphilitic inflammation in the pial septa and around the vessels extending into the nerve. Thus he believes, and his work is supported by the findings of Marie and Leri and others, that the degeneration is always secondary to this primary inflammation, and that the term primary optic atrophy is a misnomer. This conception offers some hope that treatment may be of some effect, if the diagnosis is made before the degeneration is too far under way. Ordinary antiluetic treatment, however, is usually ineffective, as the drugs used cannot be brought into intimate enough contact with the diseased tissues. This is true also of the Swift-Ellis treatment, for Schoenberg has proved that drugs injected in this way rarely if ever reach above the basal cisternae. He could, however, stain the nerves intensely by injecting dyes into the lateral ventricle. He used this method with some success in treating optic atrophy, injecting salvarsanized serum, but, in most of his cases, this was not done until a fairly late stage. Suker reports much better success by the use of mercury bichloride by this route. Four of the author's cases are reported in which bichloride of mercury was injected into the lateral ventricle or the basal cisterna, the injections being made by Drs. Suker, Young, and Keegan. Injection into the basal cisterna seems to be the method of choice, as by it the technique is simplified and reactions were minimal. One case with vision of $\frac{20}{200}$ and $\frac{20}{50}$, and much contracted fields, whose vision had failed rapidly during one week of observation, improved markedly after

a course of four injections. Ten months later vision was $\frac{20}{15}$ in both eyes, and the fields, though still small, were considerably larger than at first. In a second case, where vision was reduced to $\frac{5}{200}$ in the best eye, signs of paresis were already present, and treatment was of no effect. The third case had vision of $\frac{18}{200}$ in the best eye, with a relative scotoma occupying the whole lower half of the field. He received three injections and after a year showed the same central vision as at first, with a clearing up of the scotoma so that he could read fairly well, and an improvement in other symptoms thought to be those of beginning tabes. A fourth case received four injections. Vision failed from $\frac{20}{30}$ to $\frac{20}{60}$ during treatment, but remained stationary at that point at the time of the last examination and since vision was failing rapidly before treatment was begun, it was considered that the treatment was of some effect. General treatment is also carried out in these cases, but the intracisternal treatment is begun as soon as the diagnosis is made, as, in the author's experience general treatment alone has always proven ineffective. [Author's abstract.]

Gourfein-Welt and Redaillé. SUPERIOR QUADRANT HEMIANOPSIA.
[*Revue Générale d'Ophtalmologie*, August, 1921.]

This clinical report of a woman, aged fifty-four years, shows an affection of the sight following suddenly upon a short illness. Examination revealed an homonymous hemianopsia of the right upper quadrant with preservation of macular vision and some concentric contraction of the field. Two months later she had a right hemiplegia and two months after this she died. Examination of the brain showed four areas of softening in the left hemisphere, situated along the course of the posterior cerebral artery and its branches. Serial sections were made and are described from behind forwards. In the first area for some distance the occipital pole was normal, then followed a sclerosed area, which occupied the lower lip of the calcarine fissure, the lingual lobe and part of the fusiform lobule and extended forward to the cornu of Ammon. The white substance above the occipital horn of the lateral ventricle was intact. The second area partly severed the visual fibers in the posterior region of the internal capsule and the third extended into the external geniculate body. From various considerations it is obvious that the first area, which was the oldest, was the cause of the quadrant hemianopsia. The authors conclude that the lower part of the retina is represented in the inferior lip of the calcarine fissure. The persistence of vision in the horizontal and vertical meridians is regarded as supporting the theory that both occipital lobes supply the vertical meridian and that both lips of the calcarine fissure supply the horizontal meridian. The integrity of the occipital pole favors the theory that the macula is represented behind the calcarine fissure. A further conclusion is that visual fibers returning to the superior lip of the calcarine fissure pass above the occipital horn, those going to the lower lip pass below the occipital horn.

Moore. RENAL RETINITIS. [British Journ. of Ophthalmol., May, 1922.]

Renal retinitis of an unusual type is reported here as occurring in a man of forty-five years, who, without any history of previous illness, complained of failing sight, the retinal changes being so severe as to produce detachment of the retina in both eyes. The retinitis and retinal detachments slowly disappeared until, at the end of nineteen months, his blood pressure was reduced and the albumin had disappeared, the only ocular change, beyond signs of secondary atrophy and attenuated vessels, being a very little exudate. During the greater part of the next five and a half years he was working overtime in a small arms factory, at the end of which time he returned under observation with blood pressure 265 mm., a heavy cloud of albumin, and the fundi but little altered since he was last seen. Shortly afterwards he was admitted to hospital and died in uremia. The *post mortem* examination showed chronic nephritis, arteriosclerosis, nutmeg liver, and oedema and infarction of the lungs. Microscopic examination of the eyes showed no retinal detachment, but a slight exudate in Henle's layer in the left eye, with a peculiar localized proliferation in the retina. The case is of interest on account of the length of time the patient lived after developing renal retinitis, the disappearance of the detachments, and the subsidence of the retinitis, it being comparatively rare to be able to trace its gradual disappearance to a point at which it may be said to have completely subsided. Since very few patients die in uremia without presenting some fundus changes it would appear that this case would not have died without developing retinitis had not the eyes been protected against its recurrence as a consequence of the atrophy following the previous disease.

Scarlett, H. W., and Ingham, S. D. VISUAL DEFECTS AND OCCIPITAL LOBE LESIONS. [Am. Archives of Neurology and Psychiatry, VIII, No. 3, p. 225.]

In this clinical report surgical injuries to the occipital lobes formed the basis of the syndromes presented in thirteen patients. In the three cases the brain had been cut into for a considerable distance, passing from one hemisphere to the other across the median line in two of the patients. The Roentgen ray revealed projectiles in the substance of the brain near the opposite side of the cranium from the points of entrance in two. In one there was evidence that a projectile had been removed by early operation. Small fragments of bone were revealed within the cranial cavity near the defect in the skull in a number of the cases reported. It was impossible to determine with accuracy the extent of the brain injuries because none of the patients died or were autopsied. The authors make some general correlations in spite of this lack and also suggest that a minute overlap of innervation exists along the entire vertical line separating the retinal halves. Each half of the macula is thus in relation with the corresponding occipital cortex, and the fixation

point, situated on the line of division, possesses bilateral cortical connections, as shown by Holmes, Henschen, and others.

Stieren, Edward. NEUROFIBROMA OF THE ORBIT. [Read before the American Academy of Ophthalmology and Oto-Laryngology, September, 1922.]

The patient, a Hebrew, twenty-eight, developed a moderate exophthalmos accompanied by a progressive hypermetropia and edema. Later, ocular movements became restricted causing annoying diplopia. A diagnosis of tumor within the muscle cone, probably involving the optic nerve, was made. Operation consisted of a horizontal incision from the external canthus carried three inches towards the temple and removing one-half inch of the outer orbital rim. After the orbital periosteum was incised horizontally above the external rectus, a finger introduced felt a round hard mass which was removed by finger dissection. The tumor was encapsulated, slightly nodular and almost round, measuring 25 mm. in diameter and weighed 5.5 grams. It was not attached to the optic nerve but arose from the floor of the orbit, well back. Healing was uneventful, the false hypermetropia and the edema of the disc and retina rapidly disappeared, vision improved from $\frac{6}{30}$ to $\frac{6}{10}$, with complete recovery of ocular movements. The tumor, examined by Haythorne and Richey, proved to be a neurofibroma, the fourth to be recorded in literature as arising in the orbit. The points emphasized by the author, apart from the rarity of the condition, are that progressive hypermetropia does not necessarily indicate a tumor of the optic nerve; operation should be performed early to preserve the integrity of the eye, and that many orbital tumors can be removed without resecting the outer orbital wall as in almost every case of exophthalmos the posterior pole of the eye is on the same level as the outer margin of the orbit. [Author's abstract.]

Amat, M. Marin. OPHTHALMOPLAGIC MIGRAINE NEURALGIA. [Siglo Med., LXX, No. 3585. J. A. M. A.]

Marin Amat here reports three new cases of migraine with ophthalmoplegia followed by persisting sensory-motor disturbances in the ocular muscles on that side and atrophy of the optic nerve on the other side. In his first case, published in 1919, the pain returned three times in the course of five years, finally becoming so severe that the woman of twenty-nine became imbecile, and died. In the second case, this ophthalmoplegic migraine of a month's standing seemed to be arrested by protein therapy. The woman of fifty-six has had no recurrence during the year or two since the course of three parenteral injections of 4 c.c. of milk. She seems now entirely well. The third patient seemed to be doing well under the course of protein therapy; the pain had subsided, but the ophthalmoplegia persisted, and the woman died suddenly five days after the last parenteral injection. The fourth patient was a man of fifty-five, and the intense pain in the left side of the head and brow had first

appeared, with the total oculomotor paralysis, a month before. Protein therapy and other measures gave no relief in this case. Marin Amat says that about 100 cases of this recurring painful paralysis of the ocular muscles had been published by 1920. It progresses from a recurring affection to become continuous, with periodical exacerbations. He never found any evidence of syphilis in his four cases, but the patients had all been subjected to privations. Many of the cases on record terminated fatally. Protein therapy seemed to be responsible for the cure in one or two of his cases but displayed no efficacy in the others. The extreme intensity of the pain and the absolute failure of all measures for relief might justify a palliative operation on the nerves involved, or injection of alcohol.

Sachs, B. SHALL WE DECOMPRESS FOR CHOKED DISK? [Am. Arch. of Neur. and Psych., VIII, No. 5.]

This author expresses the belief that the ordinary decompression operation, whether subtemporal or suboccipital, promises little for the relief of choked disk; in twenty-nine out of thirty-eight cases it was practically time and labor wasted. Instead of performing this operation, every effort should be made to attack the tumor itself and to remove the neoplasm, provided the patient's life can be spared.

Reeder, Wm. G. ETHMO-SPHENOIDAL DISEASE AND RETRO-BULBAR NEURITIS. [Illinois Medical Journal, November, 1921.]

The type of nasal disease associated with retrobulbar neuritis is the deep or destructive type of hyperplastic ethmosphenoidal disease according to this study. He holds that a nasal etiology probably exists in less than ten per cent of patients with retrobulbar neuritis. The most constant finding is a central circular scotoma for red and green. The eye symptoms are quite constant, whatever be the etiology. Retrobulbar neuritis of nasal origin usually manifests definite symptoms of nasal disease, with signs of orbital involvement and probably an enlarged blind spot. Reeder is of opinion that the surgeon is justified in advising an exploratory nasal operation in cases of obscure etiology.

2. PERIPHERAL NERVES.

Fraga, C. ETIOLOGY OF BERIBERI. [Braz. Med., December 23, 1922, II, No. 5; J. A. M. A.]

Fraga presents evidence to sustain his conviction that beriberi—in Brazil, at least—is an infectious disease and not a deficiency disease. A one-sided or oversterilized diet may afford a predisposition, but this alone will not induce beriberi. He describes the clinical picture in three cases under close supervision from the very first symptoms. Two in this group

were medical students. The onset was always that of an acute infectious disease. The polyneuritis developed about the fifth day. The acute infectious onset is generally ascribed to influenza or something else, and the connection with the polyneuritis escapes notice. He cites two groups of nine convicts each in the penitentiary at Bahia who volunteered for experiments on promise of release. They were fed on hulled or sterilized rice or other deficient diet for a month or six weeks, but none developed polyneuritis. He adds that perhaps the strongest argument in favor of the infectious origin of beriberi is the success of treatment with arsenicals. At the Bahia insane asylum, Baretto Prager has had most encouraging results with neoarsphenamin. In a recent epidemic of beriberi, cure under neoarsphenamin was comparatively rapid. If a deficiency diet were alone responsible, how could this benefit from arsenical treatment be explained?

Söderbergh, G. MOTOR DISTURBANCES AFTER ZONA. [Acta Medica Scandinavica, LIV, No. 2.]

In this eleventh communication Söderbergh discusses the motor disturbances left by zona in ten of fifteen cases. Their segmental localization, the rotation of the umbilicus and the paresis and atrophy of muscles are shown in a chart in connection with the site the herpes zoster had occupied.

Targowla, R. THE CEREBRO-SPINAL FLUID IN HERPES ZOSTER. [Paris méd., November 25, 1922, p. 480.]

The author states that during the course of, or in convalescence from, herpes zoster a meningeal reaction is frequently found, characterized by hypertension of the cerebrospinal fluid, with or without increase of albumin and the number of cells in the fluid. He has recently observed five cases at the Villejuif Asylum, consisting of three cases of general paralysis, one of dementia precox, and one of mental enfeeblement due to a circumscribed lesion of the brain, in which herpes zoster developed and lumbar puncture was performed. The cerebrospinal fluid in these cases did not appear to be affected by the occurrence of herpes zoster. The reaction of colloidal benzoin in particular was not changed, and the alubumin and lymphocytosis in the fluid did not undergo any appreciable alteration. In two cases of general paralysis, however, the tension of the fluid was raised.

Marinesco, G. HERPES ZOSTER. [Bull. d. l'Acad. d. Méd., LXXXVIII, No. 41.]

In this communication Marinesco found it difficult to inoculate the cornea of rabbits with herpes zoster. He classes the disease among the neurotropic epithelioses, and believes the virus is propagated along the nerves.

3. SPINAL CORD.

Farnell, F. J. INTRAVENOUS ADMINISTRATION OF IODIDES. [Am. Arch. of Neur. and Psych., Vol. VII, No. 6, p. 729.]

Recognizing the value of intravenous hypertonic iodids in the treatment of oidiomycosis, at least 400 intravenous injections of hypertonic iodids have been given by Farnell and observations have been made on the value of this iodid therapy. He has used sodium idoid exclusively. The preparation is made in from 8 to 15 per cent (10 per cent is the usual rate) solutions in distilled water, which is also autoclaved—amount, 100 c.c. This is then boiled and cooled and given by gravity intravenously (made fresh for each treatment). A distinctly hypertonic solution of high concentration is thus produced. In no case has there been any irritation of the digestive tract. Skin eruptions were observed in one case. Coryza was observed in one case. Farnell is convinced that iodine injected into the blood stream in hypertonic form has a tendency to reduce the idiosyncrasy toward iodism. Iodids introduced into the blood stream appear to readjust systemic fungus disturbances (oidiomycosis) very rapidly. Iodids injected intravenously in concentrated form appear to help materially the action of arsphenamin on the diseased tissues and cells. Iodids introduced into the blood stream in hypertonic solutions probably have some influence on reducing the edema, hyperemia, etc., of the brain in increased brain bulk disorders.

Kerppola, W. DIFFERENTIATION OF SPINAL CORD AFFECTIONS. [Fins. Läk. Hand., LXIV, Nos. 9-10.]

In this clinical study founded upon thirteen cases of spinal cord implication the author analyzes the possibilities of minute differentiation, particularly with reference to actual cord involvement or lesions adjacent to the cord. Among other distinguishing features he says that when the sensibility in the lower sacral segments is retained—especially the thermal sense—this testifies to an extramedullary process. When the sensibility is abolished on one or both sides, the probabilities are in favor of some process in the spinal cord itself.

Jackson, H. THE CIRCULATION OF THE CEREBROSPINAL FLUID. [Journal A. M. A., October 21, 1922.]

This is a review of our knowledge of the cerebrospinal fluid circulation, and shows the effect of cranial trauma on it. The study is based on the observation of more than 400 cases of brain injury, at the Cook County Hospital. In 95 per cent of all severe head injuries with or without the presence of fracture of the skull, there is contusion of the brain or meninges. This is usually of the contrecoup variety, affecting in most cases the cerebrum, so that opposite sides of the brain are involved. There always result hemorrhage and swelling of the brain,

tending to the obliteration of the subarachnoid spaces. This leads to more or less complete stasis of the cerebrospinal fluid, and its circulation ceases to a greater or less degree, depending on the extent and severity of the trauma. The following method of treatment has been followed by Jackson: In all suspected cases of injury to the head, lumbar puncture is performed within six to twelve hours to determine accurately the extent of the injury. Withdrawal of fluid can be made every twelve to twenty-four hours, depending on the height of the original pressure found and also on the rapidity with which it reforms after each drainage. The patients are kept in bed for two or three weeks after the spinal pressure has become normal. Headaches and stupor are relieved by the withdrawal of fluid in these pathologic states. A recurrence of hemorrhage after lumbar drainage has never been noted. The immediate results are borne out by a reduction in mortality from 50 to 25 per cent. The remote results are seen in the absence of continued headaches, nervousness, irritability, vertigo and inability to work. Lastly, the treatment advocated leaves no mutilating skull defect, and is without danger.

Dible, J. H. COLLOIDAL BENZOIN REACTION IN THE CEREBROSPINAL FLUID. [Lancet, June 3, 1922, Vol. I, No. 5153, p. 1090.]

This author's experience points to the fact that a negative reaction is present only with healthy cerebrospinal fluid. The positive reaction indicates an alteration in the cerebrospinal fluid which is strongly indicative of syphilis. An ambiguous reaction indicates a pathologic condition in the cerebrospinal fluid, but does not indicate the nature of the etiological factors.

Dubreuil, G. HISTOPHYSIOLOGICAL CONDITIONING OF THE SENSE OF TACTILE PAIN. [C. R. de la Soc. de biologie, Vol. LXXXIII, No. 36, p. 1555.]

Dubreuil attempts to show what are the histophysiological conditions which are realized when there is pain, that spoken of as spontaneous or that which results from actions which are habitually painless in a normal state of the tissues. He states as a principle that congestion, particularly venous congestion, is favorable to the functioning of the higher senses. The organs of the higher senses are provided with organs of venous vascularization; choroid for the eye, stria vascularis of the cochlea for the ear, abundant vessels for the olfactory mucosa, venus sinus for the gustatory papillae, venus sinus for the tactile hairs of certain animals.

But the organs of the sense of touch are not provided in general with these means for congestion. In the normal condition they furnish only obtuse sensations. The sense of touch is relatively a lower sense. But if accidentally a local congestion of the skin comes about the organs of touch of that region become infinitely more impressionable and in their congestion they respond to a normal impression with an exaggerated perception. The sensations which have become very strong will be painful.

In fact all the affections which are accompanied by congestion are very painful, others are proportionally much less so. Compare the sebaceous cyst with the furuncle, the cold abscess with the acute abscess, spina ventosa with gout, hydrarthrosis and rheumatism, pulmonary tuberculosis and pneumonia, actinomycosis and odontalgia, etc. Therefore one should consider that nerves and nerve terminations peculiar to the sense of pain do not exist. The nerves and terminations of touch are sufficient to produce pain whether in the normal state through a violent lesion (cut, bruise, etc.) or in the pathological state under the influence of a slight irritation on the condition that there exists about these nerves and nerve terminations a zone of violent congestion. Even the fact that the congestion exists along the tract of the nervous conductor is sufficient to cause slight impressions to be perceived as painful sensations (as in the case of certain neuritides). The author makes a special application of this theory to the study of inflammations and shows that the pain symptom is subordinate to the symptom of redness in the inflammatory reactions. [Author's abstract.]

Vincent, C., and Bernard, E. NEW KIND OF PARAPLEGIA. [*Presse Méd.* XXX, No. 93.]

These authors describe a case of apparent paraplegia due to a contraction of the anterior tibialis, with spasms similar to those occurring in Parkinson's disease.

Warnock, Fanny. COLLOIDAL BENZOIN REACTION OF CEREBROSPINAL FLUID. [*Journal of Laboratory and Clinical Medicine*, April, 1922.]

This investigator carried out the colloidal benzoïn reaction as given by Guillain, Laroche and Lechelle, on all the spinal fluids received in the laboratories of the Michael Reese Hospital during five months. This study comprised eighty-seven cerebrospinal fluids, twenty-nine of which were diagnosed syphilitic, either clinically or from the laboratory standpoint, and fifty-eight of which were nonsyphilitic. Of the twenty-nine syphilitic fluids twelve precipitated in the syphilitic zone. Each of them continued beyond that range; of the fifty-eight nonsyphilitic fluids fifteen precipitated in the syphilitic zone. The following conclusions are drawn: Undoubtedly syphilitic cerebrospinal fluids do not regularly precipitate in any definite zone of dilutions. The benzoïn reaction adds little in doubtful syphilitic cases. Tuberculous meningitic cerebrospinal fluids do not precipitate the colloidal benzoïn in any definite range of dilutions. Many nonsyphilitic cerebrospinal fluids do precipitate the colloidal benzoïn suspension, and even precipitate it in the so-called syphilitic zone.

Johns, F. M. CORRELATION OF BLOOD, SPINAL FLUID AND CLINICAL FINDINGS. [*N. O. Med. & Surg. J.*l., April, 1923. *J. A. M. A.*]

Of 100 cases analyzed by Johns in which syphilis was possibly present, forty-two were diagnosed as such. In 85 per cent of the positive diag-

noses, confirmatory laboratory findings were present in the blood or spinal fluid. In forty cases there was clinical evidence of organic central nervous system involvement, with thirty-nine showing clinical evidence of meningeal involvement and thirty-four of these gave evidence of organic degenerative changes in the spinal fluid. All of the cases in this limited series that presented either an increased globulin content, + colloidal gold reaction or increased cell count presented some degree of symptoms referable to a meningeal involvement. Two cases of tertiary syphilis with no evidence of central nervous involvement gave neither increase in the globulins and cells nor reaction with colloidal gold.

Horrax, Gilbert. XANTHOCHROMIA DUE TO ACUTE, PURULENT, SPINAL MENINGITIS. [Am. Arch. of Neurology and Psychiatry, Vol. VIII, p. 24.]

The author reviews briefly recent contributions to the literature on xanthochromia, special attention being paid to the analysis of 100 cases by Sprunt and Walker in 1917 and to the series of ninety-two chronic diseases of the spinal cord published by Elsberg and Rochfort in the same year. A variety of conditions in the central nervous system may give rise to yellow spinal fluid, but it is especially prevalent when the cord is so compressed as to isolate the cerebrospinal fluid space below the point of pressure.

The writer reports a case of purulent spinal meningitis, in which the fibrinopurulent exudate was excessively thick (6 mm.), over a short distance on the posterior surface of the cord. This exudate by compression and adhesion had undoubtedly isolated the lumbar subarachnoid space, thus giving rise to the typical xanthochromatic fluid obtained by lumbar puncture. [Author's abstract.]

4. MIDBRAIN, CEREBELLUM.

Gordon, A. PONTO-CEREBELLAR TUMORS WITH FEW SYMPTOMS. [Arch. Intern. Med., November 15, 1922, p. 607.]

Gordon here points out that the diagnosis of brain tumors developing at the pontocerebellar angle is often made without great difficulty. If the tumor originates in the cerebellum, cerebellar symptoms will occur first. If the tumor originates in the eighth nerve, vestibular or auditory symptoms will occur first. Besides the eighth, also the seventh, sixth, and fifth nerves are very often affected. But in some cases the symptoms are slight and indefinite, and the author records seven such cases. In these seven cases even the ocular fundi were normal in five, and in the other two only retinal hemorrhages and venous engorgement were found. A sign detected, however, in all of these cases was the error in pointing with the hand on the side of the disease (the result of a disturbance in the regulation and in the coördination of voluntary movements, which are

controlled, directly or indirectly, by the cerebellum). The author regards the pointing error as a sign of great localizing value. He also considers persistent pain in the area of distribution of one or two branches of the trigeminal nerve as highly suggestive of the disease. This pain is not of the typical neuralgic character, but is described as a burning, boring, pulling pain. H. W. Stenvers has pointed out that in several instances X-ray examination has revealed erosion of the mesial part of the petrous bone in tumors of the cerebellopontine angle.

Rossi, G. REMOVAL OF PORTIONS OF CORTEX CEREBELLI AFTER INTERRUPTION OF CIRCULATION. [*Arch. fisiol.*, XX, 191; *Med. Sc.*]

The asymmetrical position of the limbs consequent upon unilateral removal of portions of cortex cerebelli persists after the death of the experimental animal and becomes plainer after the onset of cadaveric rigidity. The same postural asymmetry is observed if the operation is performed after complete interruption of the greater circulation, and does not differ qualitatively from that obtained after removal of the same parts of cortex cerebelli in the living animal. This fact proves the existence of cerebellar cortical centers, the lesion of which gives rise to manifestations entirely independent of any primary or circulatory alteration of the cerebellar nuclei. [C. da Fano.]

Hawthorne, C. O. CEREBRAL & CEREBELLAR HEMORRHAGES. [*Practitioner*, CIX, No. 6.]

Two examples are here recorded of swift and sudden death from intracranial hemorrhage in two boys, aged seventeen and fourteen years, respectively. Each was in good health, and there was no history or evidence of violence. In one case there was a considerable hemorrhage deep in the substance of the midcerebellum but no sign of injury and no other evidence of disease. In the other case there was a large hemorrhage in the left frontal lobe and both lateral ventricles were full of blood.

Rebattu and Gardère. TRAUMATIC MENINGEAL CYST OF THE LEFT CEREBELLAR LOBE WITH QUADRIPLÉGIA. [*Presse Médicale*, XXX, p. 631.]

The writers report the case of a patient who, after an occipital trauma, had a left hemiplegia and, some months later, a quadriplegia. Two and a half years after the trauma necropsy showed a subarachnoid cyst of the size of an orange, occupying the outer part of the left cerebellar lobe; it had compressed the cerebellum, pons, and bulb on the right side, and had led to atrophy of the left cerebellar hemisphere. The cyst contained an ochrey fluid, and was surrounded by a thickened adherent membrane. There had been an old meningeal hemorrhage at the site of the cyst-formation. It is noteworthy that there had been no cerebellar nor bulbar symptoms during life. [Leonard J. Kidd, London, England.]

Yerger, C. F. OTITIC ABSCESS OF THE CEREBELLUM. [Journal A. M. A., January 27, 1923.]

The case reported is of especial interest, (1) because of the difficulties it shows in diagnosis (some cases will give few, if any, localizing signs); (2) because a cerebellar abscess was found on surgical exploration of the posterior cranial fossa, and (3) because the necropsy report was added to the clinical record, thereby making the case record complete.

Dide and Peyton. BILATERAL PONTINE SYNDROME. [Encéphale, XVII, No. 9.]

This clinical report deals with a patient thirty-seven years of age who in childhood possibly had an encephalitis. Since this early time the patient had had a complete loss of lateral movements of the eyes, asynergy, and tremors of the head and extremities. The cranial nerve functions were normal except for impaired hearing on the right side. There was arrested mental development as well.

Marinesco and Draganesco. VERTEBRAL BULBAR HEMISYNDROME [Ann. d. Méd., January, 1923, XIII, No. 1.]

This is a clinical study of a case of thrombosis of the right vertebral artery, which had caused softening of the middle layer of the medulla oblongata, bringing about a typical syndrome of Avellis, namely, paralysis of one vocal cord and half of the soft palate with hemiplegia of the other side. The case presented further some features of interest concerning the localization of different functional groups in the pneumogastric nucleus.

Dandy, Walter E. TUMOURS OF THE CEREBELLO-PONTINE ANGLE. [Bull. of Johns Hopkins Hosp., September, 1922.]

Tumors most frequently met with in the cerebellopontine angle are usually encapsulated endotheliomata. These tumors are potentially benign, but their removal is attended by such a high mortality that operation undertaken with this object has seldom been deemed advisable. The operation of partial intracapsular enucleation is unsatisfactory on account of the recurrence of the tumor. Five years ago the author performed successfully complete removal of a growth from a patient who has since remained well. He has subsequently removed tumors in this situation with varying success and has gradually evolved a procedure which has been successful in the last two patients operated on. In one patient the operation was performed in two stages. He states that the one-stage operation is preferable, because in the interval between stages the capsule of the tumor becomes friable and more difficult to handle. The operation consists in a bilateral suboccipital exposure of the cerebellum with as extensive an exposure as possible of the affected angle. The interior of the growth is removed with a curette. The capsule is picked up with forceps and, beginning at the upper and lower poles, is carefully drawn

away from the medulla oblongata, pons varolii and midbrain. By this means the vessels entering the tumor from the brain stem are brought into view. These vessels are ligated with fine ligatures and divided. The author states that in this way the whole tumor can be delivered from its bed without injury to the brain stem and without bleeding. The cranial nerves, which are intimately associated with the tumor, are automatically liberated as the capsule falls away.

III. SYMBOLIC NEUROLOGY.

1. PSYCHONEUROSES.

Schenk, P. NEUROLOGICAL MISTAKES. [Med. Klinik, May 4, 1924.]

The history of an officer whose left arm was paralyzed following a bullet wound is here given in detail. The radial nerve had been sutured yet the function did not return. The extremity was cyanotic. There was no atrophy. Numerous physicians and quacks declared the condition incurable. The patient was cured by psychotherapy eight years after the wound. It is interesting that he passionately refused to consider amputation of the arm.

Lee, M. A. M., and Kleitman, N. STUDIES ON THE PHYSIOLOGY OF SLEEP.

II. ATTEMPTS TO DEMONSTRATE FUNCTIONAL CHANGES IN THE NERVOUS SYSTEM DURING EXPERIMENTAL INSOMNIA. [Am. Jl. Physiol., LXVII, 141.]

This paper is a continuation of a previous paper on the effect of experimental insomnia in man lasting for periods of 60 to 114 hours. The effects on the nervous system are remarkable by their absence. Knee-jerk and pupillary reflex are unaffected; the sensory threshold for faradic stimuli, ability to react to auditory and visual stimuli, to name opposites, to multiply mentally, show no change in insomnia as had been found previously by Robinson and Herdmann. The power to maintain one's equilibrium, however, as indicated by Romberg's test, showed marked deterioration. This may possibly be due to muscular fatigue. Incidentally it is noted that the knee-jerk promptly disappears with the onset of sleep.

Ziehen, T. PSYCHOLOGY AND MEDICINE. [Deut. med. Woch., June 13, 1924. J. A. M. A.]

Ziehen believes that only experimental psychology is of interest to medicine. It does not consist in expensive apparatus and laboratories but in systematic examination of psychic processes on many individuals under varied conditions. The progress of psychologic methods has not been utilized sufficiently in neurology. Many psychiatrists believe that the frontal lobes have some special relation to the higher intellectual functions. In spite of this the papers published on affections of the

frontal lobes contain only reports on mental tests which would be just sufficient in a case of fully developed general paralysis. He reviews the present problems of psychology and the advantages which would be derived in psychiatry from their closer study.

McCracken v. Swift & Co. (Mo.), 250 S. W. R. 953. PHYSICAL VERSUS MENTAL SUFFERING. [J. A. M. A.]

The Springfield (Mo.) Court of Appeals, in affirming a judgment in favor of the plaintiff, says that this action was based on the allegation that unwholesome and foul odors were generated by the defendant at a poultry, egg, and butter house maintained by it, which odors permeated the atmosphere in the vicinity of the plaintiff's property; that the crying of fowls and the handling of large numbers of milk cans created loud and unusual noises that disturbed the inmates of the plaintiff's houses; that the accumulation of filth by the defendant bred flies in large quantities, which swarmed around and got into the plaintiff's houses; and that the filth, odors, loud and unusual noises, and flies caused great suffering and discomfort to the plaintiff in the use and enjoyment of his home. The defendant suggested that the suffering shown was mental suffering, and that damages cannot be recovered for mental anguish alone when the injury is not accompanied by malice, insult, or inhumanity. The stated legal proposition with regard to damages not being recoverable for mental anguish alone announces the rule adopted in this case. For physical suffering to warrant a recovery of damages, it must result directly from the tort or wrongful act. The court has found no case, however, which undertakes to formulate any rule by which a court or jury may be able, in all cases, to determine whether the suffering is, in a legal sense, mental or physical.

In a general way, the court may say that mental suffering affects the mind alone and physical suffering affects the body, but in applying that general formula to specific cases, the line of distinction between the two classes of suffering is not always clear. Fright, grief, and sorrow are classified as mental suffering. This is clearly right, because the effect centers in the mind and is subject to the control of the mind. In one sense, all suffering is mental, because the consciousness of it rests in the mind. If an arm is paralyzed, a blow on it will not cause suffering of any kind, because the nerves fail to carry the sense of suffering to the brain; but if the arm is normal, the sense of suffering is felt and is located at the place at which the blow was struck, and we then say that the blow caused pain in the arm, not in the mind, and in that case no action of the mind can stop the pain. That suffering is, in a legal sense, clearly physical.

In the opinion of the court, the suffering caused by foul stench, loud and unusual noises, and the pest of large numbers of flies, is just as real as that caused by a blow, and the sufferer is as clearly unable, by any

mental action of his own, to relieve against it. It cannot be dispelled by the will power of the individual affected, and hence suffering caused by these agencies should be denominated physical rather than mental, and their consideration as an element of damage is not barred by the rule that, in the absence of malice, insult or inhumanity, recovery cannot be based on mental anguish or suffering alone. Furthermore, the court thinks that the real damages suffered by the plaintiff were what were suffered by himself and family in the use and occupation of his home on account of the nuisance of which complaint was made, and that that suffering—and not the diminution of the rental value of his property—should be made the basis on which to estimate the damages suffered.

Frank. *PSYCHOLOGY OF STARVING PEOPLE.* [J. A. M. A., February 6, 1924; Vienna Letter.]

Professor Frank, of Charkov, filled the position of director of a large hospital during the time a terrible famine ravaged the southern part of the Ukraine. In this capacity he had ample opportunity to study the effect of continuous starvation upon the human body and soul. This eminent Russian scientist has described his experiences in an article published in a Russian weekly. The observations of a scientist are recorded in this article and are absolutely authentic.

The famine broke out in Ukraine quite unexpectedly, and it affected several millions of men at once. Epidemics of disease and the famine have, at some places, devastated 10 to 12 per cent of the population. Large villages became quite depopulated, and such large towns as Cherson lost the majority of their population. The famine was most serious in those districts where war, revolution, civil war, and uprisings have ravaged the country. Of course, starvation left a very deep mark on the psyche of the population. In the spiritual life of the starving people Dr. Frank distinguished two stages, one of excitement and one of depression. Naturally these two states could not be sharply distinguished from each other. They presented themselves in different ways according to the individuality and physical structure of the persons affected by famine. The bodily and mental excitement experienced in the first stage of starvation showed some resemblance to the attitude of those under the intoxicating effect of alcohol. In the beginning the body as well as the soul experiences a pleasurable excitement, rejoicing in the eventual receiving of foods, and during this period they feel themselves capable of the greatest effort. The spirit is filled with enthusiasm, and the person becomes exceedingly talkative. The drunkenness, however, continues, and nothing remains but depression, the entire breaking of body and soul, and those fighting with starvation of longer duration become idiotic and bestial. In this stage they are ruled by dark instincts, such as migrating from home. The roads and railway lines leading out from the districts inflicted with famine were crowded with these unfortunates, and most of

them did not know where they were, where they were going, and what were their plans. Many of them, who spent their nights on the rails, were crushed by the trains. Many crimes committed by the victims in this stage bore the stamp of absolute aimlessness.

Dr. Frank describes the second stage with terrible realism, on the ground of personal experiences. He writes that religious and moral commands and superstitions are annihilated. There is no family life, no social ties. The most frightful egoism, the utter indifference towards the life of another, even towards the next of kin, also towards impotent old men and children, kill every feeling of responsibility in the starving. One mother has spoken even in the first stage of famine as follows: "I have always to fight with myself, when I have to share the piece of bread, which I intended to consume myself, with my children." A man was found beside the corpse of his elder brother, whom he had killed. The knife was still in his hand, and also a piece of raw meat which he had cut out from the body of his brother. It was an everyday occurrence for children, caught in the act of stealing, to be murdered. Unchecked cruelty dominates people.

Most shocking, however, was the eating of men's flesh—cannibalism. This has been mostly met with in women. In many instances mothers killed their own children and ate their flesh. Owing to the change which has taken place in the minds of the starving men by reason of the circulatory disturbances caused by the want of food, the depression grows to such an extent that human life loses all value for these men, and the other man is a mere object, that they kill in order to preserve their own life. Several mothers, who have eaten the flesh of their own children, confessed to Dr. Frank: "He would have died, too. Thus we have saved at least our lives." Such a declaration from a mother's mouth is proof that she could not be held accountable for her deed, and the state of her mind was unsound. Dr. Frank had occasion to see some of these persons after being cured from starvation, having come to Red Cross hospitals where there was sufficient food. They recovered bodily but not mentally, so that they had to be put in insane asylums. Later on it was but natural that cannibalism led to a regular trade in human flesh. These facts show the degree of apathy and the entire disappearance of human feeling in the last stages of starvation.

Some German journals have republished Dr. Frank's article, and they add to it that the first stage of starvation is already present in Germany, being expressed in a gradual mental excitement. There are journals, too, which give expression to a fear that the second terrible stage of starvation will occur in Germany, with all its dreadful effects.

Richet, C. EXTRASENSORIAL CHANNELS OF KNOWLEDGE. [Lancet, September 8, 1923; J. A. M. A.]

The illogical thesis which Richet sustains and tries to prove by experi-

ment is that a knowledge of reality may be obtained by means other than by the ordinary channels of the senses. He says: "Every one knows that the external world is accessible to us by our senses, by vision, hearing, and touch, and to a less extent by smell and taste. No other ways are known. [This is a bumble puppy statement. The human being has over twenty different senses.] It is the universal opinion that we can have no other notion of the reality that surrounds us except through our *five* senses [kindergarten neurology!], and that any fact must remain forever unknown unless sight, touch, or vision has revealed it to us. This is the classic and at the same time popular idea. It is formal and exclusive, without itself ever having been demonstrated. To admit that a knowledge of occurrences can arrive at our consciousness by any other means than those of the senses, is a daring and revolutionary proceeding, and yet this is the thesis that I am about to maintain." Richet proposes to call this new science metapsychics. He divides it into two distinct groups: (1) subjective metapsychics, which deals only with the phenomena of consciousness, and (2) objective metapsychics, dealing with the external phenomena which are not explicable by the ordinary laws of mechanics. Much of this discussion concerns second sight, clairvoyance, cryptesthesia, hypnotism, etc., as means of acquiring knowledge.

Kuffner, K. MEDICO-LEGAL SIGNIFICANCE OF "HYPNOSIS." [Cas. lek. ces., April 21, 1923; J. A. M. A.]

Kuffner publishes a medico-legal case of alleged rape of a hypnotized girl. Besides giving the reasons which speak against the reliability of the witness, and against the alleged hypnosis, he asserts his belief that a hypnosis is principally the expression of willingness of the person to be mastered by the hypnotizing subject. Everybody likes to be suggested to do what he would like to do, and agrees to follow in the hypnosis as far as his own wishes go.

Aschenheim, E. PSYCHIC INANITION OF INFANTS. [Jahr. f. Kind., April, 1923.]

Aschenheim finds that older infants are inhibited in their psychic and somatic development if left alone. Association with other infants or children is necessary, especially in institutions.

Pfister, O. PLATO: A FORERUNNER OF PSYCHO-ANALYSIS. [Int. Jl. Ps., Vol. III, No. 2.]

According to Plato, our author states, Eros, Love, is above all the instinct of sex or propagation. Plato did not in the least depreciate the part played in life by these instincts; the union of man and woman for the purposes of procreation was to him a holy thing, but love reaches still greater heights; it seeks the beautiful, and impregnation becomes a spiritual deed. Eros may be turned to the abstract, to the world of ideas and finally attains divinity. A modern student of Plato is quoted as

showing "that all of the amplifications of the usual conception of the sexual instinct which Freud has made, much to the disgust of so many academicians, are to be found in the works of the founder of the Academy" (Plato).

Pfister calls attention to a number of passages showing the identity of the conceptions, "for medicine may be regarded generally as the knowledge of the loves and the desires of the body, and how to satisfy them or not." These indicate in but a fragmentary manner Plato's vision of the interaction of mental processes and the workings of the mind as a whole, a vision which Pfister states had been entirely overlooked by most, until Freud again insisted upon them and provided newer technical methods for the study of this great synthesis in the unconscious. Here in this region also Pfister shows that Plato's conception of the unconscious as the source of religion, philosophy, and the creative genius in general is a statement no less clear than Freud's.

Ferenczi, S. THE SYMBOLISM OF THE BRIDGE. [Int. Jl. Psch., Vol. III, Part 2.]

This is a fascinating contribution to the large and important subject of symbolism and its relation to unconscious phantasy. "Dream interpretation and analysis of neuroses remain the most trustworthy foundation of every kind of symbolism, because in them we can observe *in anima vili* the motivation, and further the whole genesis, of mental structures of this kind." Certainty regarding symbolic relations can only be attained in psychoanalysis. In other fields—myths, fairy tales, folklore, etc.—such security may be problematical, but in analysis security seems to be three-dimensional. Bridges often play a striking part in dreams. When definite historical associations are lacking a typical symbolic significance of bridges is often sought for. The author speaks of its appearance in a whole series of cases and offers some pertinent ideas concerning the interpretation. The bridge is the male organ, and in particular the powerful organ of the father, which unites two landscapes (the two parents in the giant shapes in which they appear to the infant view). This bridge spans a wide and perilous stream, from which all life takes its origin, into which man longs all his life to return, and to which the adult does periodically return, though only by proxy—through a portion of himself." The dreamer—Ferenczi here speaks only of the male—is without exception suffering from sexual impotence [a safe bet] and makes use of this genital weakness to protect himself from the dangerous proximity of women."

The verification of his views he obtains from an analysis of a patient suffering from a bridge anxiety and retarded ejaculations. The patient could not cross a bridge alone, and in the course of the analysis—when a strong transference had been established—he clung to the analyst like a vise until they had crossed the middle, when he became cheerful and the

anxiety vanished." He was afraid of the woman's genitals; he could not completely surrender. The bridge has two meanings: uniting member between the parents, and links, between "life and not life." These supplement each other. The father's organ is actually the bridge which expedited the unborn (the not yet born) into life. When *historical* dream material is obtainable, it is important to remember, says Ferenczi, that there may be no symbolic significance.

In a postscript to this communication the author touches on the possible meaning of bridge symbolism and the Don Juan legend. Here he writes he has tried to show the numerous layers of meaning which the bridge has attained in the unconscious. Here the bridge is (1) the male member which unites the parents during intercourse, and to which the child must cling if it is not to perish in the "deep water" across which the bridge is thrown. (2) In so far as it is thanks to the male member that we have come into the world at all out of that water the bridge is an important vehicle between the Beyond (the condition of the unborn, the womb) and the Here (life). (3) Since man is not able to imagine death, the Beyond *after* life, except in the image of the past, consequently as a return to the womb, to water, to Mother Earth, the bridge is also the symbol of the pathway to death. (4) Finally the bridge may be used as a formal representation of "transitions," "changes of condition," in general. In the original Don Juan legend the motives, 1-3, are closely related and are confirmation of the interpretation.

Zappert, J. NEUROSES IN CHILDREN. [Arch. f. Kind., July 21, 1923.]

This classificatory paper makes seven groups represented by neuropathies, psychopathies, habit neuroses (from pathologic conditional reflexes or from autoerotism), imitation neuroses, Freud's anxiety neuroses, obsession neuroses, and hysteria. He presents evidence that certain symptoms which we have been labeling as psychopathic, in reality are dependent on endocrine influences. Even the participation of different diatheses can be surmised at times. Nervous children are sometimes hypersensitive to different drugs, some of which may have a directly opposite action. He adds that pediatricians must accept a sexual element evident in certain neuroses, even in quite young children. He says further that the ultimate prognosis had better be guarded in the last three of the groups mentioned above.

Friedjung, J. K. ENVIRONMENTAL TYPES OF PREADOLESCENCE. [Zeit. f. Kind., 1924.]

The single child, the unloved child, and the child disturbed by parental quarrels or jealousy of his sisters and brothers are here discussed in a fairly comprehensive manner. Careful study of these environmental conditions is indispensable to lead the neuropathic child toward a better adjusted mental life.

Günther, H. AFTER SENSATIONS, ESPECIALLY SENSORY ITERATIONS, ALSO SENSORY REFRACTION PHASES. [D. Zschr. f. Nervhik., Vol. LXXVI, Nos. 5, 6.]

The author defines after sensations as those which arise after the sensation which normally appeared upon stimulus has run its course and without a new stimulus, the sensations being either given a false interpretation subjectively as new stimulus reactions or felt as the after effect of the stimulus actually given. Günther emphasizes a special group of such after sensations. These are represented by a quasi autochthonous repetition once or oftener of the same sensation, the repetition corresponding completely to the adequate sensation which follows the stimulus. These after sensations are named iterations and are distinguished as motor and sensory. Such sensory iterations are reported by Günther as found in cases of tabes and in a case of hemiplegia. He does not yet attempt to explain them etiologically.

Westerman-Holstijn, J. ANALYSIS OF TORTICOLLIS. [Int. Jl. Psa., Vol. III, Part 2.]

A baker's assistant, forty-three years of age, has had since the age of forty a spasmodic torticollis. It did not seriously incommode him at first, but by reason of emotional experiences had been getting so that he had an almost continual tonic cramp of the spinal accessory muscles. It ceased during sleep. Para tics (Meige), smelling thumbs, holding hand to eyes, lifting lapels of coat, also were present, and some could be substituted for the torticollis. They finally interfered with his pushing the baker's cart. During his treatment other symptoms became manifest. He had been impotent a year. He could not go out and smoking started the tics.

Dream analyses now follow. The first available one was one he had when he was about twelve years old. "*I fell into a hole and sank very far down; the longer it lasted the deeper I fell. At the end I screamed aloud and then woke up.*" All of the free associations are given: They come to show that the "fear is the same, whether I fall into the hole, or go to my wife." The idea that his wife might die arose from the symbol of coitus and the parent constellation was soon evident. The hole was his mother's grave. It soon came out that in his coitus with his wife the mother was the phantasy object. His dread during coitus was the fear of incest—the same fear as expressed in the twelve-year-old dream. A sister fixation soon showed. When he was five and she seven she forced him to coitus experiments. He later produced too many dreams, having first said he never dreamed (resistance), and later his family complexes appeared, those of the six-year-old brother relationship soon appearing as significant. His brother and sister were also intimate. His dream associations soon brought the brother into phantasy relations with the wife and as a father-substitute as a punisher of his incestuous phantasies

to mother and sister. His brother was ambivalently his model. A later dream brought up repressed homosexual situations—an old man had looked at him with a telescope while bathing: he feared he would attack him. Mutual onanism at the age of thirteen. Then he recalled his brother forcing him to masturbate him when he was four years old and taking a pseudo-coitus position in the activity.

In searching for determiners of the neck-turning. These came from interruption while with his wife in coitus. He thought another sister was coming into the room and he suddenly turned his head to see. This became a not unusual action. He would turn and listen and this interrupted the coitus. This brought up the idea of his turning to see if his brother was coming when he was playing with the sister. Then this sister was equated with the brother. She was a dominating figure in the household. She had a severe rectal trouble and once caught him masturbating, and represented the repressed religious element in the family.

The author then reconstructs the whole neurosis in detail, which should be read in the original. The therapeutic results were quite satisfactory.

Koster, S. HYPNOSIS IN TREATMENT OF NEURALGIA AND NEURITIS. [Ned. Tijds. v. Gen., January 12, 1924; J. A. M. A.]

Koster remarks that sciatica, sciatic neuritis and neuritis of the lumbosacral plexus are peculiarly amenable to treatment by hypnosis, even without adjuvants. He summarizes from the literature sixteen cases cured by this means, and twelve out of fifteen in his own practice. One other patient was materially improved, but two others failed to show any benefit from the treatment. The course of treatment included from two to five applications of hypnosis, and the patients were dismissed clinically cured in from nineteen to sixty-three days, an average of thirty-nine. In a parallel series of fifteen cases treated with ordinary measures, only five were cured and the average stay in the hospital was forty-eight days. He argues that the mind has a great deal to do with all organic affections, and, by excluding the psychic element by hypnosis, we not only relieve subjective symptoms but induce conditions more auspicious for the healing of the organic lesion. We may be able to arrest the pain in a tabetic crisis or with gastric cancer almost as effectually as with morphin, and we can likewise arrest or alleviate the pain in angina pectoris.

Villinger, W. ARE THERE PSYCHOGENIC, NON-HYSTERICAL PSYCHOSES UPON A NORMALLY PSYCHIC FOUNDATION? A CONTRIBUTION TO THE PSYCHOGENIC THEORY. [Zschr. f. d. ges. Neurol., Vol. LVII.]

The author reports a most interesting formation of a temporary "prison psychosis" on a normally psychological basis to serve as a restoration of a character to its former ideal of self-esteem. The patient was a country girl physically and intellectually well developed although

of a somewhat shut-in disposition, artistic, schizoid. But she was of a strong personality, energetic, and with a strong impulse toward worthiness of character. She had become pregnant through a single sex relationship with a Russian war prisoner who had worked with her in the country and she had killed her child. During her imprisonment she developed a brief psychosis through which, in the form of hallucinatory religious ideas and religiously toned sensory delusions, she had purified herself, obtained forgiveness and mercy, and become a child of God. The writer believes that there is no hysterical nature to such a psychosis, for there was here no seeking for external effect or advantage through the illness but rather an internal solution of a severe struggle. The shame which she faced was something which affected her most prominent trait of character, her strong impulse to be a worthy character, attacking thus the very components out of which the pathological condition could naturally arise.

Mitchell, T. W. PSYCHOTHERAPEUTICS AND PSYCHOPATHOLOGY. [British Medical Journal, Sept. 23, 1922.]

In the history of medicine the development of rational therapeutics has taken place in closest connection with the growth in our knowledge of pathology, and a psychotherapy not based upon psychopathology is little more than pure empiricism. To-day treatment through the mind is emerging from the empirical phase, to take its rightful place when psychopathology shall be accepted as a necessary part of general pathology. To psychiatrists and neurologists, trained to see the proximate causes of all disease in morbid structure or functioning of the bodily organism, the notion of psychopathology as implying mental causation of disease is a shibboleth. Even those who profess belief in a strict parallelism of neural and mental states seem to give precedence to the neural change in both normal and psychopathic conditions. Yet the common sense of mankind accepts the causal nature of the relation between mind and body and in all our conduct their interaction is more or less tacitly assumed.

A consideration of the results obtained by "suggestion" in the treatment of functional, or even organic, bodily disorders may justify the extension of the sphere of psychopathology to include more than the psychoneuroses and psychoses. If there be a true interaction between mind and body, the assumption that that which is relieved through the mind must originate in the mind is unnecessary. Moreover in making such a generalization (based mainly on our knowledge of conversion hysteria), we are in danger of forgetting the work of the hypnotists in the treatment of bodily disorders and of regarding as valid only those psychotherapeutic measures which are most useful in dealing with the psychoneuroses. That there is a tendency so to restrict the field of psychotherapy is largely due to the fact that many

practicing psychotheraputists derive nearly all their knowledge of this branch of treatment from war experience and that practically all war cases treated by them were cases of neurosis, psychoneurosis or psychosis. Of late years it has been held that the results of curative suggestions given to the patient in a state of relaxation are in no way inferior to those obtained in hypnosis. Other therapeutic systems have laid stress on persuasion and reëducation of the patient, the appeal to reason being the essential feature of this method and recovery being held to depend on the rational acceptance of the physician's explanation. Yet we know that failure or success depends not on the truth of the explanation, but on the faith instilled into the patient's mind. Reasonable explanation necessitates fuller inquiry into the nature and origin of the illness, but, in so far as the patient's conscious recollection fails, the explanation remains inadequate. In the war neuroses in which amnesia was prominent the importance of reassociating dissociated memories was realized and hypnosis and other measures were largely used to recover them. The conception of dissociation we owe to Janet, but by nearly all those who dealt with the war neuroses the Freudian doctrine of mental conflict and repression came to be accepted as the cause of dissociation, in preference to Janet's views of a lack of mental synthesis due to lowering of nervous tension. In the attempt to secure reassociation by overcoming amnesia we approach a rational treatment of the psychoneuroses. Where dissociation is *en masse* and of recent origin, hypnosis is easily induced and the lost memories may readily be recovered, but if the dissociation is of a more discrete and complex character hypnosis is of little service in relieving psychoneurotic disabilities. In war cases of the latter kind it was recognized that some sort of analysis of the mind was necessary. Various methods were tried and various theories advanced, but the field of mental analysis was dominated by the body of doctrine associated with the name of Freud. Many of the tenets of his school were accepted, but the almost unanimous adoption of his theory of repression was combined with the rejection of his *libido* theory of the neuroses, a strange eagerness being displayed in the repudiation of a sexual etiology. Psychoanalysis throws an illuminating light on the mental processes at work in such uncritical rejection. The psychoanalytic investigation of the neurotic mind has brought us a genuine psychopathology in which are revealed the morbid structure of the psychoneuroses and the processes of their development. It must be remembered that the best established formulations of psychoanalysis are derived from the study of the transference neuroses: conversion hysteria, anxiety hysteria and compulsion neurosis. Of late, however, the part played by *narcissistic libido* in the production of psychoses and traumatic neuroses has been recognized and awaits further investigation. In considering objections to the doctrines of psychoanalysis a distinction may be drawn between psychoanalysis as a method

of psychopathological investigation and psychoanalysis as a therapeutic measure. The psychopathologist may accept the supreme importance ascribed in Freudian psychology to psychosexual tendencies; the therapist may hesitate, from a sense of responsibility to the patient, to press his investigations. To the objection to the "thoroughgoing determinism" of psychoanalysis the reply is that determinism is a necessary postulate of scientific investigation. The psychopathologist, as scientific investigator, cannot object to psychoanalysis because of its deterministic standpoint; the therapist may feel it incumbent on him to act as a moral or spiritual director who cannot abandon belief in human freedom. But no good can come of the attempt to introduce ethical or moral considerations into the purely scientific investigation of a mind. [Author's Abstract.]

MacKenzie. FUNCTIONAL PARAPLEGIA (WITH CASE REPORT). [Can. Med. Assn. Jl., Vol. XII, No. 10.]

MacKenzie reports such a case in a lady who for seventeen years had been a complete invalid. Until the age of twenty-one, she had no illness of any importance, but she was looked upon as delicate; her school work was above the average. She attended the Provincial Normal School. In 1901 she was employed as a teacher. In September, 1902, she had typhoid fever. She apparently recovered, but found that she was unable to move arms or legs. This was the beginning of a paraplegia which lasted for seventeen years. During this time changes were of a minor character and in the direction of improvement. In the second year, for instance, the muscles of the hands and forearms became relaxed and normal, and she was able to feed herself, paint china, crochet, and do fancy work. She passed through the usual program for hysterical patients. When she wished to turn her head, she would ask for help, and it was quite plain that the inability to move the head was due to spasticity of opposing muscles and not to paralysis. There was a hyperesthesia and hyperalgesia of the skin all over the body and an obvious fear of being hurt. There were no anesthetic areas. The deep reflexes were all exaggerated; there were no abdominal reflexes. She complained of severe pain in the back, legs and neck, *i.e.*, in the areas of spasticity. The first seance consisted of grasping her head with the hands, moving it from side to side and in an antero-posterior direction until the muscles were tired and felt relaxed. Then she was asked to make the effort herself, assisting her less and less until she was performing the movements herself. He then said sharply to her, "Now you can move your head, you have already done it, do it again." To her great surprise she found that she had complete control of all her head movements, the spasticity of the muscles disappeared, and what was most interesting, they never became spastic again. It was the first time in seventeen

years that she moved her head freely. The prospect of her cure was now a certainty. On each successive day other groups were dealt with in the same successful manner. At the same time that spasm ceased, the pain also disappeared. For a time the edema of the feet and legs threatened to defeat all efforts, but time and patience won. On the fifth day she walked across the room supported by the doctor and nurse; on the fourteenth day she took her first motor ride and walked to and from the car with the assistance of the nurse. During the fifth week she took walks on the streets. At the end of seven weeks she returned to her home as an ordinary passenger on the train. [Austr. M. J.]

4. MEDICO-LEGAL; SOCIAL.

Visher, John F. A STUDY IN CONSTITUTIONAL PSYCHOPATHIC INFERIORITY. [Mental Hygiene, Vol. VI, No. 4, pp. 729-745.]

The author, who feels that the syndrome of constitutional psychopathic inferiority has not been clearly defined in the literature, made a clinical and statistical study of fifty psychopaths at U. S. Veterans Hospital No. 37, Waukesha, Wis. The following tentative definition was formulated: "From the psychological standpoint, the constitutional psychopathic inferior presents marked inherent defects in volition and inhibition, together with a lowered threshold for and disproportionate response to implicit and explicit stimuli. There is also a lack of balance in the various hereditary and acquired reaction patterns and habit systems. The individual is unable to adjust to his inadequacies, either by means of experience or by the formation of compensatory modes of reaction. From the behavioristic standpoint, the condition is characterized by marked egotism, impulsiveness, poor judgment, nonconformity to ethical and social standards and inability to adjust to or profit by discipline." The author discusses the mental mechanisms of this disorder and accounts for the more important symptoms. Statistics are given which bear on heredity, educational status, drug addiction, adjustment to military life, vocational training, periods of hospitalization, etc. A tentative classification of cases of constitutional psychopathic inferiority into the following types is made, inadequate personality type, hobo type, pathological liar and swindler type, drug addict type and criminal type. Each of these is illustrated by a detailed case report. The diagnosis of constitutional psychopathic inferiority is given and its differentiation from constitutional psychopathic state, constitutional inferiority, mental subnormality psychasthenia and hysteria is discussed. The author thinks that the treatment of constitutional psychopathic inferiority in the adult is unsatisfactory. Choosing the right vocation for him and keeping him at it, would be the ideal solution. Actually this is very difficult to do. "Not a few soldiers, sailors, traveling salesmen, peddlers, railroad men, explorers and prospectors are sublimated hoboes. Many musicians, actors,

professional boxers and baseball players are psychopathic and not a few poets, artists, reformers and politicians must also be so classified." The opinion is expressed that work with psychopathic children is much more likely to be successful. "If we can attack what Salmon aptly calls "the habit of delinquency" at its beginning, and teach parents the importance of rational training for their children, we will be striking at the root of the evil." [Author's abstract.]

Hildebrandt, F. METABOLIC CHANGES FOLLOWING CHRONIC MORPHINE POISONING. [Arch. f. exper. Path. u. Pharmacol., XCII, 68.]

In the first place the author has carried out some interesting and careful experiments on the metabolism of rats (a) when fed with thyroid gland, (b) when thyroidectomized. He measures the oxygen intake and CO₂ production in rats by E. Rohde's method during five consecutive one-hour periods after the consumption of a standard meal. He also estimates their excretion of nitrogen. In this way he establishes that feeding with thyroid (1) increases the oxygen consumption, (2) increases the N excretion, (3) lowers the respiratory quotient. In the first week or two following thyroidectomy, on the other hand, he finds that, compared with the rat before the operation, (1) the oxygen consumption is diminished, (2) the respiratory quotient rises to the neighborhood of 1.0. He concludes, from the changes in the respiratory quotient, that feeding thyroid gland increases the proportion of fat metabolized, while removal of the thyroid gland diminishes the combustion of fat. The result of the continued administration of morphine to rats over a period of twenty-eight days (in which daily doses were increased from 10 mgm. per 100 gm. to 60 mgm. per 100 gm.) was to change the metabolism in the same way as did thyroidectomy, and the respiratory quotient rose from 0.7 or 0.8 to 0.9 or 1.0.

Prouette, L., and Fryer, D. AFFECTIVE FACTORS IN VOCATIONAL MALADJUSTMENT. [Mental Hygiene, VII, No. 1, p. 102.]

Without minimizing the importance of the level of intelligence in determining the vocational adjustment of an individual, the authors emphasize the equal significance of affective reactions in furthering or preventing a satisfactory adaptation to his occupation. The individual whose position places too great a strain upon his intellectual capacity, and the person who has not sufficient scope for his full powers, will inevitably suffer irritation or mental strain from this maladjustment. But the individual who is emotionally maladjusted to his work will present even greater defensive reactions, and is in considerable danger of becoming psychopathic. Emotional levels vary widely, so that the normal level may vary for different individuals. As a rule the maladjusted individual is on a depressed level, although states of excitement, and even of mania, due to uncongenial occupation, may occur. The patient may require the attention of a psychiatrist. He may be fairly

aware of his condition, and of the causes, and yet be unable, for various reasons, to escape from the situation.

If the depressed state is due to an inferiority complex, it is not always possible or necessary for the vocational counsellor to determine whether or not this complex has an organic basis. Frequently the relief of trivial factors in the vocational environment will restore the individual to his normal state of mind. The inferiority complex may also be based upon physical disabilities which yield to exercise and improved conditions of life. In other cases the sense of inferiority is so strong as to affect all contacts with the world, and does not yield to reassurance and encouragement. A fundamental lack of confidence in one's own capacity for any line of work, based upon past failures or disappointments, is difficult to overcome, especially if personal worries and unfavorable domestic conditions complicate the situation. One case is cited in which maladjustment was founded upon paranoia, aggravated by the nagging of a neurotic mother.

In some cases the dissatisfaction is based upon addiction to phrenology, astrology, "character analysts," and other props of a narcissistic order. If the individual can be convinced that he must depend upon himself in working out his problems, he will probably be able to find the vocational niche into which he will fit comfortably.

Such real disabilities as deafness, cardiac disease, and nervous exhaustion play a large part in maladjustments, and must be met by proper selection of occupation to avoid physical strain.

Excessive individualism may lead to rebellion against authority and a general belligerent attitude toward employers and fellow workers. This is frequently due to parental tyranny or other domestic friction. The emotional tension and difficulty in readjustment to civilian life, following military service, is an important factor. The tendency to escape by day dreams from uninteresting work is a dangerous habit. Advice from the counsellor as to the actual capacities of the individual may lead to the finding of more congenial occupation. The economic factor is very potent in these maladjustments. The necessity for making more money to meet domestic or social demands, and the fear of sickness under the undue strain of increased business effort, with consequent financial distress, may well cause maladjustment of a serious nature. In general, there is little connection between the affective disturbances here described and the ability for the mental work required. Inefficiency induced by depression is explainable on the emotional basis of loss of interest, self-distrust, lowered drive, and loss of physical vitality. Emotional blocking may decrease the intelligence quotient considerably. In the cases which do not require psychiatric treatment, the problem of the vocational adviser is to discover the original cause of the emotional disturbance, and to aid the individual in breaking up the conditioned reaction, either by change of environment or by the suggestion of outside interests which will diminish the tension.

BOOK REVIEWS

Pfeifer, R. A. DER GEISTESKRANKE UND SEIN WERK. [Alfred Kröner Verlag, Leipzig. \$1.70.]

The author, first assistant in the psychiatric clinic at Leipzig, has chosen as a subtitle of this exquisite small monograph "A Study of Schizophrenic Art," and has offered a valuable study of the productions of a talented artist whose artistic activities and mental disturbance are interwoven in a fascinating and intricate manner.

The entire problem of unconscious productivity in its symbolic aspects are most instructively and comprehendingly set forth.

To all interested in the subject of artistic creative activity and its unconscious motivation this study will make a distinct appeal.

Tilmann. CHIRURGIE DES GEHIRNS. [Georg Thieme, Leipzig.]

Under the general title of Diagnostic and Therapeutic Mistakes and Their Avoidance, Professor Schwalbe of Berlin has edited a series of interesting monographs accenting the features of the title of the series. The present sixth volume is by Professor Tilmann of Cologne, and is a worthy successor to others already noted in these pages.

Naturally the subject of brain surgery is so large that a short monograph of seventy-four pages cannot orient the reader to all of its various phases, but it is, nevertheless, surprising to note how the salient features are here noted and discussed and what a lot of important material can be presented in so few pages.

MacCurdy, John T. PROBLEMS IN DYNAMIC PSYCHOLOGY. [The Macmillan Company, New York.]

After reading this book of nearly 400 small octavo pages the reviewer was in such a daze that he put it aside for some months for a second reading: The fog still remained, with a few clear spots here and there on rereading.

The author subtitles his work A Critique of Psychoanalysis and suggested Formulations. Like a child trying to untangle a snarled bit of string, we obtained the conviction that the snarl was worse after the effort than before, and we have more or less given up the effort to find out what message the author really has to convey.

He approaches the problem as a genial critic, with nothing up his sleeve, and pulls out of his hat, like the modern magician, an amazing array of bewilderment. He assures us that he and Dr. Hoch spent many, many hours reading Freud's works, and finally was unable to affiliate them with his background unless he changed them.

To the reviewer he finds mares' nests innumerable, and under the

guise of making Freud's ideas more lucid he leaves us with the suspicion that he has manufactured difficulties which never existed, in our own minds, at least, and substituted at times shadow for substance, and vapor for fluidity.

This is all very general and we might be asked for specific instances. We regret that we feel it is not worth while to enter into a detailed justification for such seemingly affective reactions, with the seeming aspersion on unconscious motivation.

We find the work quite complicated, uninspired, and terribly dull, only relieved by an amusing assumption of superior merit where we find quite inferior quality.

Joël, Ernst, u. Fränkel, F. DER COCAINISMUS. [Julius Springer, Berlin.]

A well-written account of Cocainism. It includes short sections on the introduction of the drug, its pharmacognosy, its chemistry, and the pharmacological action of cocaine and its many synthetic derivatives and substitutes. Its forensic significance, its psychopathology—quite inadequate from modern standards, its treatment and prevention, are also dealt with. A short bibliography completes this fairly up to date monograph.

Fortunately for mankind cocaine misuse quickly brings its devotees to a reckoning with reality. It differs greatly from morphine in that the evil results soon become manifest. In this respect it either kills its devotees off quite soon or brings them to critical situations which must be met.

Negro, Fedele. FISIOPATOLOGIA DELLE SINDROMI PARKINSONIANE. [Stabilimento Lampografico, Torino.]

Should one wish to orient himself to the modern work upon the Parkinsonian syndrome, especially as seen through the work of modern Italian neuropathology, the present monograph of 190 pages will amply repay his efforts. Not that the author has confined himself by any means to the work of his countryman, indeed the world's literature is brought into review, but the special indications of the Italian school are ably represented.

The subject has been discussed by so many and the monographs so numerous that a special analysis of the present work is unnecessary, save the general conclusion that it ranks as a well-informed and penetrating addition to this much debated problem.

Näsgaard, Sigurd. DIE FORM DER BEWUSSTHEIT. [Ernst Reinhardt, München.]

The author is a Privat-Dozent in the University of Copenhagen and the Danish original has been deemed worthy of translation by Drs. Krogh-Jensen and W. Tuchmann.

He speaks of central and peripheral consciousness, and the position of consciousness as one of the objects of the environment. Sensations, feelings, strivings, are among the unconscious factors underlying the possibilities of consciousness. They make "concep-

tions"—of red, of green, of a pair or a dozen, of sun and moon, of centaurs, triangles, etc., which in turn evolve thinking. Finally speech forms arrive. The author would expound how all this happens in this small but interesting brochure.

Bovet, Pierre. *THE FIGHTING INSTINCT.* Authorized Translation by J. Y. T. Greig. [Dodd, Mead and Company, New York.]

An excellent account of the phenomena of what McDougall calls the "Instinct of Pugnacity," not, in our opinion, a primary instinct at all, but a derivative, yet offering so many points of interest in conscious descriptive psychology as to entitle it to be considered by itself.

Starting with the phenomenology of "Children's Quarrels," the author develops his thesis most admirably at conscious levels, chiefly utilizing the questionnaire method. This method at least gives something to work with, and the author, cognizant of its shortcomings, utilizes it quite judiciously.

Quarrels, teasings, fighting, fooling, practical joking, these and other themes are quite delightfully set forth. Then comes "cruelty" and some appreciation of its pathological roots in sadomasochism. The "deflections," better "displacements" of the fighting-cruelty motives, are then rapidly surveyed, in which we find the not unusual faulty interpretation of Freud's libido-concept as "conscious sexuality."

Bovet does not fall entirely into the full misconception of Freud's formulation of sublimation, and his chapters on this subject and those on Religion and on Regression are quite informing and full of good analytic material. The conception of War as a Regressive Phenomena, as well as offering Progressive Aspects in the interest of Nationalism, is an interesting chapter.

On the whole this book is worth reading, in our opinion.

Pierson, Antoine. *ÉPILEPSIE CONGÉNITALE ET MALFORMATIONS NEURO-ECTODERMiques.* [Ancienne Imprimerie Vagner, Nancy.]

To most clinicians of ripe experience there comes the conviction that things are not as simple as they might wish, nor were taught as students, and in no field of neuropsychiatry does one find the complexities of such increasing insistence as in the epilepsies. Here perhaps most strikingly is a diagnostic label least satisfactory as offering any monistic interpretative formula.

The present most stimulating monograph, modest in size, comes as a definite contribution in this bewildering field. It is written by a pupil of L. Cornil, nephew of the histologist well known to previous generations of students, who has just gone to Nancy after doing yeoman's service under Roussy and Lhermitte in Paris.

It has long been observed that marked skin anomalies were by no means infrequent in a number of so-called idopathic epilepsies, and the author has set himself the task, in the best French manner, to see what possible relationships might exist in this correlation. This he has done by study of individual cases and by a careful review of the literature, the latter subsumed under the "stigmata diaboli" which

did not escape medieval observers. These he has put in their more modern forms as (1) Banal cutaneous malformations, (2) the neuro-fibromatoses, and (3) tuberous scleroses and sebaceous adenomata, all in their relation to epileptic phenomena, devoting several pages to historical résumés of these correlations. Then follow his clinical observations on twelve cases, one-half personally observed and the others taken from the literature. This leads him to the pathological study of these malformations and a detailed analysis of histogenetic relationships of skin and nervous structures. Here Cornil's background of study appears in an interesting light and offers many suggestive ideas. Chief of these may be mentioned the liaison of ectodermic determinants lying behind the skin changes and brain structure changes, offering a structural background for faulty energy discharge as in the epileptic fit.

Rivers, W. H. R. *PSYCHOLOGY AND POLITICS.* [Harcourt, Brace and Company, New York.]

Just before his death Dr. Rivers was persuaded to enter politics as a representative of the University of London. With his ethnological background he had a large vision of the possibilities of infusing new material into social service and gave three lectures on psychological theory as it might be applied to higher structural groups. These make up the chief contribution in this volume, one of that excellent series of the International Library of Psychology, Philosophy and Scientific Method so ably chosen and edited by C. K. Ogden.

The subject matter enlarged and here presented comprises chapters on Psychology and Politics, Instinct in Relation to Society, The Concept of the Morbid in Sociology, Socialism and Human Nature, Education and Mental Hygiene, and The Aims of Ethnology. To these G. Elliott Smith has added a note to the last address and Chas. S. Myers a testimonial on the Influence of the Late W. H. R. Rivers.

Apart from minor points of dissent, these pages are filled with valuable ideas, ideas which, when further made into common coin of mass thinking, will be of enormous significance in the art and science of politics.

Much as one must admire Elliott Smith's far-reaching grasp of anatomical philosophy, we do not think that his "Notes" are any addition to Rivers' book. His very firm grasp of structural ideas we feel has given him a large blind spot concerning functional activities behind the evolution of symbolic forms of human behavior. Apart from this minor blurb the volume stands as an initial effort of much value, even though we deem it quite second rate when compared with some of Maudsley's writings along related lines.

Boulanger-Pilet, G. *CONTRIBUTION A L'ÉTUDE DES DYSTROPHIES DE LA PUBERTÉ.* [Librairie Louis Arnette, Paris, 1924.]

An admirable clinical thesis on pubertal dystrophies more or less restricted to the endocrine level. After an initial discussion of average anthropometry in the human, still a large field for more accurate conceptions of variability, the author takes up the study of a number

of cases of anomalous development with particular reference to bony growth and fatty deposit variability. These are studied with commendable minuteness and constitute excellent observation material.

The origins of these syndromes are discussed from the endocrine point of view and a brief mention of the central nervous system participation added, showing, chiefly through the "encephalitis" syndromes, the importance of nervous pathology, to which the author too hastily makes efforts to correlate.

He modestly states that the situations are still in their initial stages of understanding, and there is still much work to be done to synthesize the endocrine and nervous system factors. To which conclusion we say "Amen."

Thorek, Max. *THE HUMAN TESTIS.* [J. B. Lippincott Company, Philadelphia and London.]

An exhaustive monograph dealing in great detail with the gross anatomy, histology, physiology, and pathology of the male gonadal system. The larger part of the monograph is concerned with the so-called endocrine functions of the male testis, in which several chapters deal with the effects of various experimental procedures involving the testicular implantations and transplantations, ligation phenomena, and related subjects much in evidence since the Voronoff, Steinach studies.

The whole is comprised in a book of over 500 pages, well written, splendidly illustrated, and fittingly printed. In short, a worthy presentation, and mostly authenticated by the author's own physiological and pharmacological research.

A few comments may be made concerning the author's use of recent psychosexual conceptions. In his description of the negro's eroticism (p. 64) he confuses the conception of "libido" with "eroticism." He speaks of the negro's libido being intact when he really means his "eroticism." Libido refers to the creative life—chiefly psychical and mostly to be studied in the unconscious—whereas eroticism refers more particularly to the conscious relations of tactile stimulability. It is of the latter alone that the author really has any cognizance. When he speaks of "the cerebral centers being plainly eroticized because of persistent erection" he is apparently oblivious of the fact that persistent priapism may exist in practically decerebrate animals and the "cerebral centers" out of the process entirely. His whole argument should be restated in terms of spinal segmental stimulus of the vegetative nervous system, in which connection the work of Spiegel is plainly not known to the author.

In his presentation of the O'Malley material he has overlooked the important series of facts emphasized in this important contribution, namely, that in the same individuals with the same gonadal structures psychical alterations determined ambivalent object libido transference. It was not the glands that caused the variations in conduct, but the psyche that determined ambivalence of behavior and the resultant modifications of bodily structure.

The chapter on homosexuality is far from satisfactory, since only structural conceptions are quoted, similarly Chapter X on the Mechanisms. It is too "hormonic" in its visualization. Also the work on dementia precox is too onesidedly seen. Mott's work, given *in extenso*, is of great interest, no doubt, but the reviewer is more of the opinion that the atrophies here seen are resultants rather than causes, and that as yet the subject does not permit the optimistic suggestions that transplantations are going to do much therapeutically here.

This type of research deserves thorough trial, but one must not forget that Brown-Séquard thought he obtained similar types of therapeutic results in his spermin injections. Spermin (Poehl) was a great favorite with more than one enthusiastic endocrinologist during the early part of the twentieth century, some of whom attributed transitory results obtained through psychical transference to the physicochemical agent employed. "*Ars longa, vita brevis est*" and the rest must be remembered, as well as "Truth is the daughter of time," of the which Bacon has so pregnantly reminded us.

Campora, Giovanni. FISIOPATOLOGIA DELLA COREA. [Barabino e Graeve, Genova.]

A well conceived and concisely written monograph of approximately 150 pages which discusses the various choreic syndromes in the light of present day research. The text of Jelliffe and White is followed more or less closely as to the general nosology of the group. The pathological anatomy discusses lesions at various levels from the oblongata to the cortex which have been known to give rise to choreic-like movements. Here a rapid summary of recent studies is given. The author then discusses very clearly the physiopathology of the choreic symptoms.

Pyramidal symptoms, cerebellar symptoms, associated movements, imitative synergies, the relations between these latter types of movement, are the sectional groupings.

The author then seeks to make a series of descriptions of the choreic movements, discussing their general characters, preintentional and in association with intention and the motor inhibitions. He constructs an interesting series of types, three in number, and closes with some general conceptions regarding the various types of movements, paying particular attention to recent striatal pathology in its relations to voluntary and involuntary movements.

The thesis is not as detailed as some of the recent German monographs, but it is a sincere and clear summary of much recent research.

Smith, Jens Chr. ATYPISKE PSYKOSER OG HETEROLOG BELASTNING. [Levin & Munksgaard, Copenhagen, 1924.]

The present study represents investigations on the effect of coexistence of heterogeneous conditions for mental diseases, especially as to whether such combinations may produce atypical, endogenous psychoses as lately often supposed, especially by Hoffmann, Kahn, and Kretschmer.

The study is divided into two parts.

The first part consists of ten families with convergent, heterogeneous conditions; the second part consists of nine families. In each of these families a child of a manic-depressive father or mother terminated in a schizophrenic state.

In the first part there are in the first filial generation twenty psychotic children from among sixty; in the following filial generations seventeen psychotic children.

The results of the study may be summed up as follows: (1) When more heterogeneous conditions are put together by two parents, numerous psychoses will appear among the descendants. (2) About one-half of the psychoses appear as pure manic-depressive or pure schizophrenic psychoses, the other half as psychoses with combined pictures: Here we have "Urstein-psychoses," the manic-depressive attacks terminating in a schizophrenic state. Continual psychoses wherein parts prevail as manic-depressive states or in which perhaps the mood may be traced after twenty years of a schizophrenic state. We find remittent psychoses in which now the pictures of the one group of psychoses domineer, now the pictures of the other group, or in which one attack has the color of the schizophrenic psychosis and the other of the manic-depressive. At last we have pictures in which epileptic conditions perhaps may be suspected as extraordinary irascibility or remarkable dimness. Dysregulation ad modum Hasselbalch-Bisgaard is found in two cases by epileptic conditions. (3) The psychoses with combined pictures may among remote descendants also occur among the posterity of the personally healthy brothers or sisters of the bearers of the atypical psychoses. (4) The fact that it seems as if a manic-depressive crossed with a schizophrenic ascendant have more schizophrenic children than a schizophrenic crossed with a personally healthy ascendant, is an indication that the manic-depressive and schizophrenic conditions perhaps do not exist quite independent of each other.

N. B.—All business communications should be made to Journal of Nervous and Mental Disease, 64 West 56th St., New York.

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INDEX TO VOLUME 61

Figures with asterisk (*) indicate original articles and are accompanied with title. Figures unaccentuated, accompanied with title, indicate abstracts.

- A** ABDOMINAL reflexes*587
 Abrahamson, Isador...*337, 494
 Abscess, brain 178
 otitic, of cerebellum..... 639
 à Court, A. H. 540
 Acuna, M. 310
 Adam 206
 Adiposis, pituitary 525
 Adipositas dolorosa, familial... 524
 Adrenal gland and epilepsy..... 205
 After sensations 647
 Alcoholism and general paresis.. 425
 chronic 326
 Alexander, W. 408
 Amat, M. Marin..... 631
 Amyotonia congenita..... 295
 Anemia, pernicious 384
 after roentgen treatment 390
 and protein sensitization ... 383
 blood and bone-marrow find-
 ings in 195
 cause and cure of..... 301
 splenectomy for 383
 treatment of 386
 Angina pectoris, neurectomy in.. 519
 Aorta, vasomotor reflex from... 618
 Aporrhagma reactions in psy-
 choses 438
 Arden-Delteil 535
 Armstrong, W. E. M. 79
 Arnstein, A. 411
 Arsphenamin in paresis 424
 Arteriosclerosis and arteriolo-
 sclerosis 515
 Arthritis, neuropathic 195
 psychopathology and metabo-
 lism 196
 Arthropathy, psoriatic 76
 tabetic 311
 Aschenheim, E. 644
 Ashmore, B. L. 206
 Astasia-abasia in a girl of thirteen 543
 Asthenia of syphilitic origin 85
 Asthenopia treated by psycho-
 therapy 93
 Asthma 77
 Astwazaturow, M.*587
 Ataxia, acute cerebellar 535
 hereditary cerebellar 421
 subacute and transient 310
 Atrioventricular bundle, delayed
 conduction through right and
 left branches of 518
 Atrophy, hereditary optic..... 405
 optic, radiography in 404
 treatment of 628
 Aubry 423
 Auricchio, L. 296
 Avian leukemia 390
- B** ABONNEIX, L. 81
 Bachmann, George 391
 Bailey, Percival 291, 624
 Bambarén 91
 Banus, J. 425
 Banzhaf, E. J. 603
 Barkman, A. 292
 Barnard, T. W. 404
 Basal metabolism, influence of
 growth on, of children..... 394
 Basedow's disease 196
 and polyarthritis chronica de-
 formans progressiva 196
 Bastiaanse, van Bouwdijk 311
 Baylac 208
 Bayliss, W. M. 413
 Bebb, Grace L.*356
 Becco, R. 523
 Behavior, myelinogeny applied to
 study of 540
 Bénard, R. 80
 Benon, R. 433
 Benzoin precipitation reaction in
 syphilitic cerebrospinal fluid 309
 Berger, H. 320
 Beriberi, etiology of 632
 Berkeley-Hill, O. 203
 Bernard, E. 636
 Berner, J. H. 75
 Betcher 417
 Bier, A. 60
 Bilateral pontine syndrome 639
 Biological foundations 65
 thought in France at end of
 XIXth century 64
 Bishop, Louis Faugeres*232
 Bize 208
 Blackford, Charles Minor 522

Blood and cerebrospinal fluid in paresis	425
bases of	388
chemistry in mental diseases..	437
coagulation of and endocrines..	388
glands, multiple sclerosis of..	521
phosphate, seasonal tide of in infants	389
pressure findings after beer drinking	618
production, influence of thyroid on	388
spinal fluid and clinical findings, correlation of	636
sugar, estimations of	387
Blumberg	623
Blumgarten, A. S.	394, 402
Bolten, G. C.	80
Bone marrow, mammalian, circulation in	303

Book reviews:

Adler, Alfred, Praxis und Theorie der Individualpsychologie	448
Adler, Alfred, The Practice and Theory of Individual Psychology. Translated by P. Radin	335
Alexander, F. M., Constructive Conscious Control of the Individual	105
Alexander, G., Marburg, O., and Brunner, H., Handbuch der Neurologie des Ohres. I Band, 2 Haelfte	553
Allbutt, T. Clifford, Notes on the Composition of Scientific Papers	335
Barany, Robert, Die Radikalooperation des Ohres	445
Barnes, Francis S., An Introduction to the Study of Mental Disorders. Second Edition	106
Baudouin, Charles, Psychoanalysis and Esthetics	212
Bernhardt, E. A., Psychische Vorgänge betrachtet als Bewegungen	215
Boulanger-Pilet, G., Contribution a l'Etude des Dystrophies de la Puberté.	658
Bouman, L., en Brouwer, B., Leerboek der Zenuwziekten. Deel 1, 1st Gedeelte.	334

Book Reviews—Continued

Bouman, L., and Brouwer, B., Leerboek der Zenuwziekten. Deel 1, 2d Gedeelte.	558
Bovet, Pierre, The Fighting Instinct. Authorized Translation by J. Y. T. Greig.	657
Brown, William, Talks on Psychotherapy	101
Brownlee, John, The Origin and Distribution of Racial Types in Scotland	333
Burkamp, Wilhelm, Die Kausalität des psychischen Prozesses und der unbewussten Aktionsregulationen	99
Campora, Giovanni, Fisiopatologia della Corea	660
Cattell, Henry W., International Clinics. Vol. II, 33, Series 1923	448
Cattell, H. W., International Clinics. Vol. III. Thirty-third Series	439
Charon, René, La Psychiatrie en Clientèle. Comment Guérir? Bibliothèque des Praticiens	558
Cohn, Toby, Leitfaden der Elektrodiagnostik und Elektrotherapie für Praktiker und Studierende. Siebente Auflage	331
Cole, R. H., Mental Diseases. Third Edition	98
Cowdry, Edmund V., General Cytology. A Textbook of Cellular Structure and Function for Students of Biology and Medicine	444
Cushny, Arthur R., A Textbook of Pharmacology and Therapeutics. Eighth Edition	333
Davis, Loyal Edward, Neurologic Diagnosis	101
de Selincourt, Hugh, One Little Boy	556
Dingler, Hugo, Die Grundgedanken der Machschen Philosophie	551
Dürken, Bernard, Allgemeine Abstammungslehre	100
Edenharter, G. F., Report from the Department of Pathology, Central Indiana Hospital for the Insane. Vol. VIII.	106

Book Reviews—*Continued*

- Eidmann, H., Die Entwicklungsgeschichte der Zähne des Menschens 214
- Fabritius, H., Zur Klinik der nichtparalytischen Lues-Psychosen 104
- Ferraro, Armando, Étude Anatomique du Système Nerveux Central d'un Chien dont le Pallium a été Enlevé 446
- Frank, Ludwig, Seelenleben und Rechtsprechung 447
- Freud, Sigmund, Der Wahn und die Träume in W. Jensen's "Gradiva" 104
- Freud, Sigmund, Ueber Psychoanalyse. Siebente Unveränderte Auflage 330
- Goepfert, Hans, Bericht über den Ersten Kongress für Heilpädagogik 328
- Goldschmidt, Richard, Einführung in die Vererbungswissenschaft. Vierte Auflage 107
- Graber, Gustav Hans, Die Ambivalenz des Kindes. Imago Bücher VI 447
- Guardia, Antonio, La Clinica del Simpático y Parasimpático 553
- Hadfield, J. A., Psychology and Morals. An Analysis of Character 213
- Hall, Arthur J., Epidemic Encephalitis. (Encephalitis Lethargica.) 328
- Heidenhain, Martin, Formen und Kräfte in der lebendigen Natur 108
- Hellpach, Willy, Geopsychische Erscheinungen 106
- Henning, Hans, Der Geruch. Zweite Auflage 332
- Henning, Hans, Ernst Mach als Philosoph, Physiker und Psycholog 551
- Herbert, S., The Unconscious Mind. A Psycho-Analytical Survey 102
- Heymans, G., Die Gesetze und Elemente des wissenschaftlichen Denkens 98
- Jöel, Ernst, u. Fränkel, F., Der Cocainismus 656
- Jones, Ernest, Essays in Applied Psycho-analysis. The International Psycho-analytical Library, No. 5 211
- Jones, Ernest, Papers on Psycho-Analysis. Third Edition 100

Book Reviews—*Continued*

- Kafka, Gustav, Handbuch der vergleichende Psychologie. Band III. Die Funktionen des abnormen Seelenlebens 555
- Kantor, John L., The Treatment of the Common Disorders of Digestion 335
- Kirchoff, Theodor F., Deutsche Irrenaezte. Zweite Band 446
- Kraus, Friedrich, u. Brugsch, Theodor, Spezielle Pathologie und Therapie innerer Krankheiten. In 10 Bänden 99
- Kronfeld, Arthur, Psychotherapie; Charakterlehre; Psychoanalyse; Hypnose; Psychagogik 103
- Kronfeld, Arthur, Sexualpathologie 445
- Lenz, Fritz, Menschliche Auslese und Rassenhygiene 102
- Lewandowsky, M., Bumke, O., Foerster, O., Handbuch der Neurologie. Ergänzungsband 329
- Leyser, E., Herzkrankheiten und Psychosen 442
- Lovell, H. Tassman, Dreams. Monograph Series II of the Australasian Association of Psychology and Philosophy. 214
- MacCurdy, John T., Problems in Dynamic Psychology 655
- Marquardt, Martha, Paul Ehrlich als Mensch und Arbeiter. Erinnerungen aus dreizehn Jahren seines Lebens (1902-1915). Mit einer Einführung von Dr. Richard Koch. 559
- McDougall, William, Outline of Psychology 331
- McKerrow, James Clark, Aberrations of Life 333
- Meagher, John F. W., A Study of Masturbation and Its Reputed Sequelæ 549
- Miles, Walter R., Effects of Alcohol on Psychophysiological Functions 106
- Moon, R. O., Hippocrates and His Successors in Relation to the Philosophy of Their Time 107
- Myerson, Emile, De l'Explication dans les Sciences 550
- Näsgaard, Sigurd, Die Form der Bewusstheit 656
- Negro, Fedele, Fisiopatologia delle Sindromi Parkinsoniane 656
- Nonne, Max, Syphilis und Nervensystem 102

Book Reviews—*Continued*

Pfeifer, R. A., <i>Der Geistes- kranke und sein Werk</i>	655
Pieron, Henri, <i>L'Année Psy- chologique. Vingt-Troisième Année, 1922</i>	552
Pieron, Henri, <i>Le Cerveau et la Pensée</i>	552
Pierson, Antoine, <i>Épilepsie Congénitale et Malformations Neuro-ectodermiques</i>	657
Purves-Stewart, James, <i>The Diagnosis of Nervous Dis- eases. Sixth Edition. Re- vised</i>	440
Rauch, Maximilian, <i>Die Funk- tionsprüfung des akustischen und statischen Labyrinths</i> ..	442
Ricaldoni, A., <i>La Encefalitis Epidémica</i>	329
Richet, Charles, <i>Traité de Métopsyche. Deuxième Edition</i>	101
Rivers, W. H. R., <i>Psychology and Politics</i>	658
Roger, Vidal, Teissier, <i>Nou- veau Traité de Médecine. Fascicules VIII. Pathologie des Glandes Endocrines Troubles du Développement</i>	551
Ronge, P. H., <i>Over de Zoo- genaamde Endotheliomen der Dura Mater</i>	332
Rutot, A., and Schaerer, M., <i>Le Mécanisme de la Survie</i>	448
Sampson, C. M., <i>Physiotherapy Technic</i>	550
Salmon, Thomas W., <i>Mind and Medicine</i>	214
Schaffer, N. M., <i>Selected Es- says on Orthopedic Surgery</i>	108
Schilder, Paul, <i>Medizinische Psychologie für Aerzte und Psychologen</i>	441
Smith, G. Elliot, <i>The Old and the New Phrenology</i>	550
Smith, Jens Chr., <i>Atypiske Psy- koser og Heterolog Belas- ting</i>	660
Sollier, Paul, et Courbon, Paul, <i>Pratique Sémiologique des Maladies Mentales</i>	551
Stekel, Wilhelm, <i>Der Fetisch- ismus</i>	443
Stekel, Wilhelm, <i>Nervöse Angstzustände und ihre Be- handlung. Vierte Auflage</i> ..	549
Stekel, Wilhelm, <i>Onanie und Homosexualität. Die Homo- sexuelle Parapathie. Dritte Auflage</i>	330

Book Reviews—*Continued*

Stekel, Wilhelm, <i>Peculiarities of Behavior. Two volumes. Translated by J. van Teslaar</i>	439
Stekel, W., Missriegler, A., u. Wittels, F., <i>Fortschritte der Sexualwissenschaft und Psy- choanalyse. Erster Band</i>	445
Stern, William, <i>Psychology of Early Childhood Up to the Sixth Year. Translated by Anna Barwell</i>	554
Strümpell, Adolf, <i>Leitfaden für die Untersuchung und Diag- nostik der wichtigsten Ner- venkrankheiten</i>	442
Tendeloo, N. Ph., <i>Konstellat- ionspathologie und Erblieh- keit</i>	103
Thorek, Max, <i>The Human Testis</i>	659
Tilman, Chirurgie des Ge- hirns	655
Tocher, J. F., <i>Anthropometric Observations on Samples of the Civil Populations of Ab- erdeenshire, Banffshire and Kincardineshire, etc.</i>	333
Vincent, Swale, <i>An Introduc- tion to the Study of Secre- tion</i>	550
Walter, Herbert Eugene, <i>Gen- etics. An Introduction to the Study of Heredity. Re- vised Edition</i>	213
White, William A., <i>Outlines of Psychiatry. Tenth Revised Edition</i>	557
Williams, E. H., and Hoag, E. B., <i>Our Fear Complexes</i> ..	105
Wimmer, August, <i>Chronic Epi- demic Encephalitis. With a Preface by Sir Frederick W. Mott</i>	440
Wimmer, August, <i>Meddelelser fra Universitetets Psykia- triske Laboratorium</i>	101
Wittels, Fritz, Sigmund Freud, Der Mann, Die Lehre, Die Schule	210, 330
Bossert, O.	314
Boston Orthopedic Club	499
Boston Society of Psychiatry and Neurology	283, 499
Bouman, L.	85
Boven, W.	545
Bowman, K. M.	437
Boyd	517
Brain abscess	178
frontal, significance of with re- spect to higher psychic func- tions	*113

- Brain abscess—*Continued*
 hemorrhage. *593
 tumor, combined ventricular
 and lumbar puncture in diag-
 nosis of 286
 vascular lesions of. 177
Bremer 624
Bridge, symbolism of. 645
Broadwin, I. T. 375
Brock 203
Bromid examthems and iodid,
 experimental aspects of 83
Brown, Charles L. 181
Brown, 2d, Sanger *161, 368
Brown, W. L. 92
Brüning, F. 617
Buchanan, J. A. 61
Büchler, P. 619
Burden, J. F. 529
Burr, C. W. 208
Burrow, Fleming 309
Busacca, A. 409
Buscaino, V. M. 315, 321
Buschke, A. 393
Buzzard, E. Farquhar. 407
Byrne, Joseph 607
- C**ACHEXIA, pituitary 525
 Cameron, H. G. 515
 Camus, Jean 412, 625
 Canavan, M. M. 324
 Cannan, R. R. 621
 Carcinoma, relation of muscular
 activity to 292
 Cardia, reflex control of. 517
 Cardiac neurosis in light of mod-
 ern cardiology *232
 Cardiology, modern *232
 Cardiorenal diseases, relation of
 hypertension to 616
 Cardiospasm 517
 Carlson 517
 Casamajor, L. 540
 Catatonia, late recovery from. . . 427
 schizophrenic, with associated
 metabolic and vegetative
 features 320
 Catatonic dementia 321
 stupor, influencing by subcu-
 taneous injections of cocain 428
 pathogenesis of 320
 Catatonics, are there specific anti-
 gens in blood of. 433
 Central nervous system, syphilis
 of 201
 Cerebellar ataxia 535
 hereditary 421
 heredo-degeneration 419
 Cerebellum 421
 Cerebral degeneration 186
 lesions, pituitary gland in. . . . 525
 localizations in organic epilepsy *142
- Cerebral degeneration—*Continued*
 neoplasm, infiltrating with de-
 generation 186
 Cerebromata 411
 Cerebrospinal fluid and blood in
 paresis 425
 absorption of into venous sys-
 tem 533
 circulation of 634
 colloid reactions of. 532
 colloidal benzoin reaction
 in 635, 636
 in congenital syphilis. 88
 in early syphilis 84
 in herpes zoster 633
 sugar in, in epilepsy. 204
 syphilitic, benzoin precipita-
 tion reaction in 309
 syphilis, treatment of 538
 Character, individual and mental
 alienation 545
 Chick, H. 196
 Chickenpox and shingles, coinci-
 dence of 82
 Choked disk, decompression for. 632
 Chordoma, malignant sphen-
 occipital *471
 Choroid plexus, pathology of in
 paresis 423
 Clairvoyants in criminal cases. . 540
 Clark, L. Pierce 51, 280
 Clark, R. 324
 Claude, H. 400, 617
 Cleidocranialis, dysostosis *18
 Cocain, influencing catatonic stup-
 or by subcutaneous injec-
 tions of 428
 Coffen, T. H. 520
 Cole, H. N. 426
 Cofe, William H. 69
 Colella, Rosolino 546
 Colin, H. 422
 Comby, J. 97, 543
 Constitutional psychopathic in-
 feriority 652
 Contracture and muscular spasm,
 treatment of 298
 Convulsions, treatment in child-
 hood 314
 Cornil, Lucien 424
 Correa, J. 523
 Cortex cerebelli, removal of por-
 tions of after interruption of
 circulation 638
 pathological alterations of. . . . *225
 Coulard, E. 80
 Coury 617
 Craig, Maurice 434
 Craniotabes 310
 Creatinuria in myasthenia gravis 299
 Crile, Dennis W. 615
 Cristel, G. 208

- Cross, Ernest S. 621
 Crothers, Bronson 499
 Csonka, F. A. 387
 Curschmann, H. 394, 421
 Cyst, traumatic meningeal, of left cerebellar lobe with quadriplegia 638
DAHLSTROM, A. W. 292
 Dalyell, E. J. 196
 Danday, W. E. 527
 Dandy, Walter E. 639
 Daniélopou 519
 D'Antona, S. 532
 Darling, I. A. 317
 Dawson, W. S. 323
 de Fursac 424
 Degenerates, recurring mental disturbance in 433
 de Jong, S. I. 415
 De Josselin, De Jong, R. 411
 Delinquency, relation between tuberculous and neuropsychopathies 546
 Della Torre, P. L. 316
 Demaria, E. B. 404
 Dementia in young children... 428
 paralytica 311
 precox 321, 323, 327
 catatonic 323
 mental health of 463 children from stock of 324
 neurosyphilis simulating 88
 sex development and behavior in male patients... 323
 sugar tolerance in 324
 Demole, D. V. 207, 208
 Dentition, disorders of 97
 Dermographia, icteric 78
 Dermatoses, nervous 79
 psychogenic 77
 de Schweinitz, G. E. 199
 Desmoulière, A. 85
 Desogus, V. 525
 de Stefano, S. 310
 Deutsch, G. 196
 Devaux, A. 85
 Diabetes insipidus, experimental researches on 624
 recovery from 620
 Diathermia, treatment of peripheral nerve paralysis with... 491
 Dible, J. H. 635
 Dide 639
 Diencephalon and hypophysis... 619
 Diseases, changes in..... 90
 Donath, Julius *113
 Draganesco, S. 514, 639
 Drinker, C. K. 303
 Drinker, K. R. 303
 Drug addicts, hemoclastic crises in 387
 Drummond, J. C. 621
 Dubreuil, G. 635
 Ductless glands and fighting and excitement 400
 during pregnancy 522
 recent views on 522
 Dudley, H. W. 619
 Duncan, J. H. 195
 Dwarfism, hypophyseal 525
 Dykes, S. C. 299
 Dysostosis cleidocranialis *18
 Dystrophia, myotonic 292
 Dystrophic syndrome 400
 Dystrophy, infantile, rôle of pituitary and pineal bodies in... 622
 progressive muscular 300
EARTHWORM, muscle tension and reflexes of 67
 Ebaugh 424
 Eberson 85
 Eckel, John L. *471, *593
 Ectodermoses, neurotropic 81
 Edel, K. 412
 Edelmann, A. 400
 Edema, angioneurotic 77
 Edhem 308
 Eisenstein, A. 623
 Eisler, M. J. 541
 Electromyographic studies of muscle tone 301
 Ellermann, V. 390
 Elliott, W. M. 84
 Elsberg, Charles A. 186
 Ely, F. A. 326
 Encephalitis, abnormal tongue movements following 366
 acute serous 181
 crossroad, somatic pathology and psychopathology at... *561
 epidemic 283
 in rabbits 603
 syphilis simulating 86
 lethargica, memory deterioration in *356
 Endocarditis, nervous manifestations in 617
 Endocrine basis of ear, nose and throat affections 523
 disturbances and undernutrition glands 394
 in tropical pathology 519, 524
 multiple sclerosis of 401
 selective tuberculous involvement of 402
 lesions of tadpoles from thallium 520
 system, influence of on intraocular tension 303
 Endocrines and coagulation of blood 398
 and psychoneuroses 388
 and 92

- Endocrines—*Continued*
in common medical diseases... 402
Endocrinology 393
positive achievements of 394
Engel, D. 521
Engelen, P. 618
Eosinophilia in children 391
persistent, with splenomegaly.. 385
Ependymoma 291
Epilepsy, alcoholic 207
and adrenal gland 205
and marriage 314
bromides and luminal in treatment of 207
continuous Jacksonian 208
early traumatic 316
endocrine syndromes associated with 207
extirpation of one suprarenal for cure of 317
hematologic pictures in endocrine syndromes 207
heredity in 208
induced 487
in offspring of epileptics..... 209
luminal, bromid, diet and eliminative treatment of 206
of cardiac origin 316
organic; considered from standpoint of cerebral localizations *142
pathogenesis of 317
periodic 204
psychological data regarding interpretation of 51
starvation of 316
sugar in cerebrospinal fluid in 204
suprarenalectomy in 314
syphilis as factor in 91
treatment by snake venom.... 318
treatment of 205, 208
Epileptic attacks due to cerebral inhibitions 204
etat de mal fatal after ovariectomy 206
myoclonus 206
polynucleosis of spinal fluid in 208
Epileptics, constitutional anomaly in 315
insane, phenobarbital treatment of 317
thickness and weight of cranial vault in 205
Epilepticus, status 318
Epileptiform manifestations in endocrinous disorders 315
Erythema nodosum, etiology of.. 82
Erythrema 76
Esophagus, diffuse dilatation of. 517
lower 517
Ethmo-sphenoidal disease and retro-bulbar neuritis 632
Evolution of human races in light of hormone theory 523
Ewald 428
Excitement, fighting and ductless glands 400
Extrapyramidal hemiplegia *167
Extrasensorial channels of knowledge 643
FABER 383
Familial adipositas dolorosa.. 524
Faradic stimulation, depressant drugs on sensory threshold for 76
Farnell, F. J. 634
Faubion, L. R. 514
Fearing, Franklin Smith *449
Federley, H. 60
Ferenczi, S. 645
Ferrero, V. 75
Fibromyxoma, cystic, of median nerve 407
Fibromyxomata, solitary, of peripheral nerve trunks 407
Fischer, Herman 205, 317
Fischer, S. 95
Flamini, M. 304
Flarer, F. 298
Fleming, G. B. 394
Fordyce 538
Forestier, J. 617
Foster, Nellis B. 616
Fourcade 536
Fraga, C. 632
Frank 642
Frazier, C. H. 416
Fremont-Smith, Frank 286
Frets, G. P. 421
Friedjung, J. K. 646
Friedreich's ataxia, familial.... 417
Frisch, F. 204
Fryer, D. 653
Functional disease, nature of... 539
Furet 421
GALLSTONES and migraine. 618
Gamna, C. 75
Ganglioneuroma, malignant 75
Gangrena arteritica suprarenalis 615
Ganser, O. 221
Ganter, R. 205
Garcia de Quevedo, L. 401
Gardère 638
Gastric crises in tabes..... 311
Gaté, J. 79
Geier, T. A. 437
Genil-Perrin, G. 327
Gericke, A. J. 426
Getzowa, Sophie 518
Gibbs, C. E. 323
Gifford, Sanford R. 628
Gilbert 617
Globus, Jos. H. 177

- Glycosuria in myasthenia gravis 299
 in neurosyphilis 203
 Goiter, exophthalmic, syphilitic
 origin of 306
 scleroderma with 80
 Goldbloom, A. 316
 Golla, F. 533
 Gordon, Alfred...*142, 197, 417, 637
 Gourfein-Welt 629
 Grabfield 76
 Grafe, E. 197
 Graft, S. 297
 Green, Edridge 627
 Griffith, J. P. C. 535
 Grimberg, L.*167
 Guillain, G. 86, 309, 310
 Günther, H. 647
- H**
 HAAS, L. 77, 83
 Hagelstam, J. 201
 Haglund, P. 528
 Haguénau 426
 Hahn, F. 391
 Hala, W. W. 603
 Haldane 65
 Hale 76
 Hall, George W. 429
 Hanns, A. 388, 620
 Hansen, I. 390
 Hanssen 538
 Hardy, W. F. 405
 Harris, W. 408
 Hartenberg, P. 204
 Hausmann, Max 518
 Havenhase, F. J. 427
 Hawthorne, C. O. 638
 Hay fever 77
 Heart and plethysmography.... 618
 in thyroid disease 518
 mammalian, distribution of
 vagus nerves to sino-auricu-
 lar junction of..... 391
 voluntary acceleration of 515
 Heise, H. 320
 Hellwig, A. 539, 540
 Helminthiasis, toxic effects of... 519
 Hemianopsia, superior quadrant. 629
 Hemibulbar retro-olivary syn-
 drome 535
 Hemiplegia alternans superior... 421
 extrapyramidal*167
 Hemoclastic crises in drug ad-
 dicts 387
 Hemorrhage, cerebral and cere-
 bellar 638
 extensive brain*593
 Hemorrhagic pachymeningitis in
 a paretic 424
 Heredity, development of laws... 61
 in epilepsy 208
 Herpes and varicella 84
 etiology of 412
- Herpes—*Continued*
 zoster 411, 633
 cerebro-spinal fluid in..... 633
 pathology of 410
 pituuitrin in treatment of... 624
 Herschmann, H. 311
 Hess, Alfred F. 389
 Hettwer, J. 533
 Heyninx, A. 403
 Hildebrandt, F. 653
 Hirsch, S. 521
 Histophysiological conditioning
 of sense of tactile pain.... 635
 Hochstetter, F. 402
 Hodgson, John S. 286
 Höglér, F. 76
 Holler, G. 388
 Holm, E. 383
 Holstijn, A. J. W. 542
 Hormone theory, evolution of hu-
 man races in light of..... 523
 Hormones on metabolism..... 394
 Horrax, Gilbert 637
 Howard, M. Q. 433
 Hristide 519
 Huddleson, James H. 270
 Human organism, medical theo-
 ries concerning 60
 Hume, M. 196
 Humes, C. D. 204
 Hunt, J. R. 535
 Huntington's chorea in twin child*466
 Hydrorrhea, nasal 77
 Hypertension, relation of to car-
 diorenal diseases 616
 Hypnosis in treatment of neural-
 gia and neuritis 648
 medico-legal significance of... 644
 Hypochondriacal trends in chil-
 dren 430
 Hypophyseal dwarfism 525
 Hypophysial disease, ocular
 symptoms in 199
 Hypophysis and diencephalon... 619
 Hypopituitarism 622
 Hysteria, paranoid trends in... 96
- I**
 IDEA and sensation, distinction
 between 95
 Imre, J. 398
 Individuality and vegetative sys-
 tem 71
 Inferiority, constitutional psy-
 chopathic 652
 Ingham, S. D. 630
 Ingvar, S. 421
 Insanity, manic-depressive 433
 mental hygiene in relation to.. 429
 Insomnia, experimental, func-
 tional changes in nervous sys-
 tem during 640
 Inter-brain and pituitary..... 625

- Internal secretion and under-nourishment 398
 current views 399
 Intraocular tension, influence of endocrine system on 398
 Iodid and bromid exanthems, experimental aspects of 83
 Iodides, intravenous administration of 634
 Izumi, G. 524
- JACKSON** 544, 634
 Jacobs, Wm. F. *471
 Jacquet, P. 86
 Jansen, Hans 192
 Jelliffe, Smith Ely 274, *561
 Johns, F. M. 636
 Jones, A. G. M. 384
 Josephi 203
- KAHLER, H.** 206
 Kaufman, I. 199
 Keith, A. 71, 523
 Kelling, G. 618
 Kerppola, W. 634
 Key 424
 Kiely, Charles E. 516
 Kindermann, K. 296
 Kleitman, N. 640
 Knoll, W. 525
 Knowledge, extrasensorial channels of 643
 Königstein 84
 Kontschalowsky, M. 623
 Korn, H. M. 518
 "Körperbau und Charakter" 60
 Koster, S. 648
 Krabbe, Knud H. *18
 Kramer, B. 388
 Kraus, F. 71
 Kraus, Walter M. 59, 416
 Kretschmer's "Körperbau und Charakter" 60
 Kronfeld, A. 437
 Kuffner, K. 644
 Kugler, E. 95
- LAFORA, G. R.** 304
 Lagrange 405
 Laignel-Lavastine 80, 422, 429
 Lancaster, Walter B. 93
 Landsteiner, K. 400
 Laroche, G. 309, 532
 Larsen, E. J. 326
 Layera, J. 404
 Leahy 315
 Lechelle, P. 86, 309
 Lederer, Max 488
 Lee, M. A. M. 640
 Lehrman, Philip R. 96
 Lemaire, H. 298
- Lemierre, A. 311
 Léopold-Lévi 621
 Lereboullet, P. 622
 Leriche, R. 616
 Letchworth Village, résumé of research work 373
 Leukaemia, avian 390
 three cases in one family 391
 Levaditi, C. 81, 425
 Lewin, P. 194
 Lewis, D. 293
 Lewis, Nolan D. C. *344
 Lewy, F. H. 296
 Liebesny 618
 Limulus, circus movements of .. 69
 Linell, E. A. 407
 Lipemia retinalis 405
 Lipodystrophy, progressive 81
 Lissner, H. 622
 Lloyd, James Hendrie 87
 Locomotor reactions of logger-head turtle 68
 Lorenz, W. F. 324
 Lossius, I. 534
 Lues cerebrospinalic with manic-depressive psychosis 311
 Lund, C. C. 303
 Lundagen, Marion A. 389
 Lux, A. 491
- MACERA, J. M.** 310
 MacFarland 308
 Mackay, H. M. M. 196
 MacKenzie 651
 Mackenzie's theory of disturbed reflexes 413
 MacLaire, A. S. *44
 MacWilliam, J. A. 410
 Main, D. C. 323
 Maiweg, H. 300
 Malarial inoculation treatment for general paresis *344
 Manic-depressive insanity, determination of sodium, potassium, calcium and magnesium, in blood and spinal fluid of patients suffering from. 433
 psychosis 311
 psychoneurotic inheritance on basis of Diem-Koller estimate of inherited injury .. 434
 Marburg, Otto *225
 Marchand, L. 206, 318
 Marcus, A. 79
 Marie, A. 425, 536
 Marinesco, G. 514, 633, 639
 Marriage and epilepsy 314
 Martinez, W. 311
 Mathias, E. 299
 Mayer-Gross, W. 438
 McCartney, J. 205
 McCracken v. Swift & Co. 641

- McDonald, S. 385
 McDougall, Wm. 539
 McGavran 391
 McGuire, E. R. 529
 Medicine and psychology..... 640
 Mehrten, H. G. 536
 Memory deterioration in enceph-
 alitis lethargica*356
 Mendelian laws 60
 Meningitis in syphilis 86
 Menninger, Karl A. 327
 Mental alienation and individual
 character 545
 defectives, New York State
 program for care of..... 368
 deficiency, clinical aspects of.. 375
 disease, blood chemistry in... 437
 study of precipitating situa-
 tion in 434
 disorder and its prevention... 434
 disturbance, recurring, in de-
 generates 433
 disturbances of cardiac origin. 316
 hospital, relation of to com-
 munity 544
 hygiene in relation to insanity 429
 versus physical suffering 641
 Merklen, P. 85
 Metabolism, hormones on 394
 Meyer, A. 60
 Migraine and gallstones..... 618
 Mirallié, C. 426
 Mitchell, T. W. 649
 Mobility 494
 Mona Lisa smile, interpretation
 of 280
 Montgomery, Douglass W. 202
 Moore 630
 Moore, A. R. 67
 Moorhouse, V. H. K..... 404
 Morat, D. 387
 Morphine poisoning, metabolic
 changes following 653
 Moser, E. 298, 428
 Motor nuclei of vagus..... 514
 Mott, F. 63, 429
 Mourgue, R. 64, 422
 Multiple sclerosis of endocrine
 glands 402
 Münzer, Fr. Th. 433
 Muscles and tonus, hardness of. 296
 Muscle tension and reflexes of
 earthworm 67
 tone, electromyographic studies
 of..... 301
 relation of sympathetic to.. 198
 tonus197, *337, 417
 and potassium ions 292
 Muscular dystrophy improved by
 adrenalin 294
 spasm and contracture, treat-
 ment of 298
 Muskens, L. J. J. 206, 297
 Myasthenia gravis, creatinuria
 and glycosuria in 299
 pseudoparalytica combined
 with scleroderma and
 weakness of adrenal sys-
 tem 299
 Myasthenic disorder, pathology
 of 299
 Myatonia congenita with inher-
 ited syphilis 304
 noncongenital in an infant... 298
 Myelin, phagocytes of 409
 Myelinization of posterior column
 of cord 199
 Myelinogeny applied to study of
 behavior 540
 Myeloid sarcoma 193
 Myoclonic reflexes 297
 Myoclonus, epileptic, myoclonic
 reflexes as basis 206
 undifferentiated 270
 Myodystonic reaction 297
 Myopathy, primary progressive.. 296
 Myositis ossificans 293
 Myotonia, cervical, in nurslings. 296
 congenita 293
 and infantile progressive
 spinal muscular atrophy.. 294
 Myotonic dystrophia 292
 Myxedema and pituitary..... 620

NARCOLEPSY 206
 during pregnancy 319
 Narcolepsies in children..... 204
 Navarro, A. 529
 Near-paranoiacs 327
 Neoplasm, infiltrating cerebral.. 186
 Nerves in fracture of wrist..... 529
 Nervous system, evolutionary levels
 in 63
 sympathetic, tumors of 75
 Neuralgia, criticism on question
 of 408
 hypnosis in treatment of.... 648
 ophthalmoplegic migraine.... 631
 Neurectomy in angina pectoris... 519
 Neuritis, hypnosis in treatment of 648
 multiple, memory defect of
 Korsakoff type 326
 optic, of dental origin..... 626
 peripheral 408
 retro-bulbar 632
 retrobulbar optic 404
 Neuroblastoma 488
 malignant 75
 Neurofibroma of orbit..... 631
 Neurological mistakes 640
 therapeutics, recent advances in 412
 Neurology in Paris, 1923-24.... 59
 Neuromata, cerebromata peculiar
 form of 411

- Neuropsychopathies and delinquency 546
- Neuroses, etiological therapy of 95
- in children 646
- organotherapy in 401
- Neurosis, cardiac in light of modern cardiology *232
- Neurosyphilis 203, 304, 307
- arsphenaminized serum in 308
- glycosuria in 203
- simulating dementia precox 88
- tabetic, palliative control of
- gastric crises of 308
- therapy in 536
- treatment of 427, 537, 538
- Neuschlosz, S. M. 292
- Neustaedter, M. 603
- Nevermann, H. 319
- New York Neurological Society
- 49, 177, 270, 366, 487, 603
- New York State program for
- care of mental defectives 368
- Neyman, Clarence A. 429
- Nicholás, Felisa 526
- Nicolas, J. 79
- Nicolau, S. 81
- Nölle 524
- Nonne 86
- Nordmann, E. 80
- Nyáry, L. 410
- O**BITUARIES:
- Fernald, Walter E. 219
- Hun, Henry 216
- Hunter, John Irvine 336
- Pick, Arnold 109
- Occipital lobe lesions and visual defects 630
- Occultism, psychology of 539
- Ocular symptoms in hypophysial disease with acquired syphilis 199
- Old age factor in psychoanalytic therapy 274
- Oliguria, primary 389
- Oppel, V. A. 615
- Optic atrophy, bilateral, associated with certain meningitic symptoms 526
- treatment of 628
- nerves, prechiasmal intracranial tumor of 527
- primary intraneural tumor of 406
- relation to sphenoidal and posterior ethmoidal sinuses 406
- Organism, human, medical theories concerning 60
- Organotherapy in neuroses and psychoses 401
- of malignant disease 521
- Osnato, M. 317
- Osteoarthritis deformans 192
- Osteitis deformans in monkeys 192
- Osteochondritis, juvenile deforming metatarsophalangeal 194
- Osteo-radio-necrosis, mechanism of 193
- Oury 617
- Ovariectomy, fatal epileptic etat de mal after 206
- Owensby, Newdigate M. *466
- P**ACHYMENINGITIS, hemorrhagic, in a paretic 424
- Pal 515
- Panton, P. N. 384
- Papastratigakis, C. 400
- Paraganglioma of Zuckerkandl's organ with hypertrophy of heart and kidney 518
- Paralysis, cases treated by sympathetic ramisection by Dr. N. D. Royle 499
- functional 540
- general, arsenical treatment of 423
- juvenile 424
- obstetrical, operative repair of plexus in 504
- periodic, with thyroid enlargement *44
- peripheral nerve, treatment of with diathermia 491
- Paramyotonia 197
- Paranoia 437
- Paranoid trends in hysteria 96
- Paraphrenia 437
- Paraplegia, functional 651
- new kind of 636
- Parathyroids 524
- Pardee, Irving H. 366
- Paresis among Arabs 425
- arsphenamin in 424
- blood and cerebrospinal fluid in clinical and anatomico-pathological study of 422
- colloidal gold reaction in 426
- general, and alcoholism 425
- intradural injections of salvarsanized serum in 313
- malarial inoculation treatment for *344
- in the aged 311
- juvenile 311
- distribution of spirochetes in 85
- onset of 426
- pathology of choroid plexus in 423
- treatment of 312
- by intracistern route 424
- Paretic curve in colloidal gold test 313
- hemorrhagic pachymeningitis in a 424
- Paris 314
- Parker, G. H. 68
- Parker, Harry L. 304

Parsons, J. P.	320	Polynucleosis of spinal fluid in epileptic	208
Pathological alterations of cortex caused by psychoses.....	*225	Polyuria	621
Pathology, somatic, and psychopathology at the encephalitis crossroad	*561	Pophal, H.	533
Paths for pain and temperature sensibility	532	Porot, A.	425
Patrzek, F.	299	Posture, man's	71
Patterson, H. A.	207	Potassium ions and muscle tonus	292
Paulain, Demetre F.	313	Potter, Howard W.	373
Pearcy	517	Preadolescence, environmental types of	646
Peck, Martin W.	*31	Pregnancy, ductless glands during	522
Peiser, B.	393	narcolepsy during	319
Pemberton, R.	196	Protein sensitization and pernicious anemia	383
Periarterial sympathectomy.	616	Prouette, L.	653
Peritz, G.	525	Pruritus with endocrine derangement	83
Pernicious anemia and protein sensitization	383	Psychiatry, comparative method in	*1
cause and cure of	301	Psychic inanition of infants.....	644
Perrin, M.	388, 620	Psychoanalytic therapy, old age factor in	274
Petrivalsky	524	Psychogenic theory, contribution to	648
Peyton	639	Psychology and medicine.....	640
Pfister, O.	644	of starving people	642
Phagocytes of myelin.....	409	Psychoneuroses and endocrines.	92
Physical versus mental suffering	641	psychological and physical symptoms in	*161
Pijper	424	Psychopathic inferiority, constitutional	652
Pike	544	Psychopahtology and psychotherapeutics	649
Pineal bodies, rôle of in infantile dystrophy	622	and somatic pathology at the encephalitis crossroad	*561
Pituitary.....	524	significance of for general somatic pathology	*246
adiposis in children.....	525	Psychoses, acute	438
and inter-brain	625	aporrhagma reactions in.....	438
and myxedema	620	organotherapy in	401
and scleroderma	80	paranoid.	437
cachexia	525	pathological alterations of cortex caused by.....	*225
extract as muscle tonic.....	297	sympathetic and periodic.....	429
hemostatic action of.....	620	tertiary syphilitic, other than paresis	90
gland	625	Psychotherapeutics and psychopathology	649
active principles of	619	Psychotherapy in treating as thenopia	93
in cerebral lesions.....	525	Puerperium from standpoint of neuropsychiatrist	432
influence of on bladder.....	624	Pupil in somatic and visceral disorders in association with referred pain and hyperalgesia	607
rôle of in infantile dystrophy.	622	Pycnolepsy	204
syndromes	621		
tumors	623, 625		
Pituitrin in treatment of herpes zoster	624		
Pitzman, Marsh	301		
Plantar response in man, phylogenetic significance of.....	531		
Plato: a forerunner of psychoanalysis	644		
Plethysmography and the heart.	618		
Pluriglandular insufficiency, congenital predisposition in.....	400		
Polyarthritits chronica deformans progressiva and Basedow's disease	196		
Polycythemia	76		
Polyglandular insufficiency	400		
syndromes	521		

Q UADRIPLEGIA 638

- R**ADIATIONS, sensitiveness
of bony tissue to..... 193
Radiography in optic atrophy... 404
Ranson, S. W. 514
Raphael, T. 320
Rebattu 638
Redaillé 629
Reeder, Wm. G. 632
Reflexes, abdominal, nature of..*587
and muscle tension of earth-
worm 67
myoclonic 297
Regaud, C. 193
Rembe. 311
Resuscitation by intra-cardiac in-
jections 615
Retina, injury of by the sun.... 404
Retinal reflex in frogs..... 404
Retinitis, renal 630
Retrolbulbar neuritis 632
optic neuritis 404
Richards, E. L. 430
Richardson, R. B. 178
Richet, C. 643
Richter, H. 199, 310
Rickets in infant..... 196
Riddoch, G. 384
Riggs, C. Eugene..... 82, 432
Riley, Henry Alsop..... 186
Risueno d'Amador, ideas of.... 64
Robin, G. 424
Roentgen irradiation for hypo-
physeal tumors 623
rays, hypersensitiveness of skin
to 77
treatment, pernicious anemia
after 390
Roggen, A. 620
Romberg sign, experimental study
of*449
Rosenbluth, B. 487
Rosenheck, C. 307
Rosenow, G. 386
Ross, C. J. 514
Rossett, J. 296
Rossi, G. 638
Rothenberg, Simon 610
Roussy, Gustave 625
Royle, N. D. 499
Rudolf, G. de M. 531
Rusdea 88
Russell, W. 318
- S**ACHS, B. 632
Sainton, P. 625
Samovici, M. 308
Sanborn, Harvey B. 283
Sanchis. 425
Sarcoma, myeloid 193
of median nerve..... 529
Scaglione 522
Scarlett, H. W..... 630
- Schaffer, K. 199, 419
Schaller, W. F. 536
Scheminzky 618
Schenk, P. 640
Schiphorst, F. B. M. B..... 91
Schizoid 429
Schizophrenia 429, 438
inheritance of 320
Schizophrenic alterations of con-
sciousness of activity..... 437
reactions 429
Schizothymia 429
Schulmann, E. 625
Schürer 78
Sciatic scoliosis 528
Scleroderma 80
and pituitary 80
combined with myasthenia
gravis pseudoparalytica 299
diffuse, after vaccination..... 79
with goiter 80
Sclerosis, multiple of blood glands 521
of endocrine glands..... 402
Scoliosis, sciatic 528
Sengès, N. 425
Sensation 529
and idea, distinction between.. 95
Sensibility, pain and temperature 532
Sensory disturbances in relation
to diagnosis 407
iterations 647
phenomena associated with de-
fective blood supply to work-
ing muscles 410
refraction phases 647
Serdinkoff, M. G. 624
Sex life of college men.....*31
Shaw, A. F. B. 385
Shingles and chickenpox, coinci-
dence of 82
Sidler-Huguenin 87
Simonin, P. 519
Sinuses, sphenoidal and posterior
ethmoidal, relation of optic
nerve to 406
Sioli, F. 60
Sivertsen, I. 292
Skin, hypersensitiveness of to
roentgen rays 77
Skliar, N. 321
Slauck, A. 294
Sleep, physiology of 640
Smell, sense of 403
Smit, J. H. 306
Smith, Dudley C. 427
Smith, H. H. 196
Smith, N. R. 83
Smithies, F. 517
Söderbergh, G. 297, 633
Sollier, P. 387
Sollmann, T. 426
Solomon, H. C. 537

Somatic pathology and psychopathology at the encephalitis crossroad	*561
Southard, Elmer Ernest.....	223
Specht, O.	314
Spiegel	84
Spiller, W. G.	416
Spinal cord affections, differentiation of	634
compression, unusual types of	610
section of anterolateral columns of	416
temperature after injury of	415
tumors	611
fluid, blood and clinical findings, correlation of	636
polynucleosis of in epileptic	208
meningitis, Xanthochromia due to	637
Spirocheta pallida, dissemination of in experimental syphilis..	85
Spirochetes, distribution of in juvenile paresis	85
Splenectomy for pernicious anemia	383
Splenomegaly with persistent eosinophilia	385
Staemmler	307
Stammerer, the confirmed.....	280
Stefanovitch	620
Stenvers, H. W.	534
Stern, F.	77
Stevenson, Lewis	49
Stewart, Matthew J.	193
Stibbe, F. S.	421
Stiefler, G.	293
Stier, A.	204
Stieren, Edward	631
Stillmunkes	208
Stopford, John S. B.	529
Strauss, I.	177
Strebel, J.	404
Strecker, E. A.	434
Striocerebellar tremor	535
Ström, S.	76
Strümpell	90
Stuurman, E. J.	207
Sugar tolerance in dementia precox	324
Sünner, P.	434
Suprarenalectomy in epilepsy....	314
Symmers, Douglas	181
Sympathectomy, treatment of vascular spasms by.....	617
Sympathetic, relation to muscle tone	198
Sympathicotonia in tachycardia. 617	
Syphilis as factor in epilepsy....	91
cerebrospinal, treatment of....	538
congenital, cerebrospinal fluid in	88
early, cerebrospinal fluid in....	84

Syphilis—*Continued*

experimental, dissemination of spirocheta pallida in.....	85
inherited, myatonia congenita with	304
offspring of persons with... ..	87
in third generation.....	89
meningitis in	86
nervous, treatment of by tartro-bismuthate of sodium and potassium	536
of central nervous system....	201
of the eighth nerve.....	87
pre-Columbian existence of in Europe	202
simulating epidemic encephalitis	86
treatment of by mercury inhalations.....	426
Syphilitic cerebrospinal fluid, benzoin precipitation reaction in	309
fever, tertiary	308
origin of exophthalmic goiter	306
Szondi, L.	83

TABES dorsalis, familial.....	309
essential lesion of.....	199
etiology and symptomatology of	91
histopathology of	199
juvenile	304, 307, 310
pathogenesis of	310
treatment of	312
gastric crises	311
Tabetic arthropathy	311
Tachycardia, sympathicotonia in	617
Tachycardias of neurotic origin. 516	
Taft, A. E.	423
Taggart, G. C.	387
Tallqvist, T. W.	398
Targowla, R.	316, 633
Taylor, Alfred S.	504
Taylor, N. B.	515
Tendon phenomena, vindication of reflex nature of	533
reflexes	533
Tethelin	621
Tezner	88
Thallium, endocrine lesions of tadpoles from	393
Thirst, intense	621
Thom, B. P.	90
Thom, D. A.	209
Thompson, L. J.	313
Thomsen's disease	296
Thyrophypoplasia	300
Thyroid disease, heart in.....	518
enlargement with periodic paralysis	*44
influence of on blood production	388

- Thyro-testiculo-hypophyso-supra-renal symptom complex.... 521
 Tic, torticollis 542
 Tilney, F. 540
 Tisdall, F. F. 388
 Tobacco-smoking, effect for
 faradic stimulation 76
 Tonus and muscles, hardness of. 296
 Torticollis, analysis of..... 647
 tic. 542
 Toulouse, E. 318
 Trampol. 423
 Traumatic hysteria with uncon-
 scious pregnancy phantasy.. 541
 Tremor, striocerebellar 535
 Tropical pathology, endocrine
 glands in 401
 Tropism theory 69
 Tubercle in tegmentum of pons.. 534
 Tuberculoma, cortical 49
 Tuberculosis, relation between
 delinquency 546
 tone of voluntary muscles in.. 298
 Tucker 620
 Tumor, brain 177
 combined ventricular and
 lumbar puncture in diag-
 nosis of 286
 hypophyseal, roentgen irradia-
 tion for 623
 in cerebellopontile angle .. 534, 639
 of sympathetic nervous system
 originating in roof of fourth
 ventricle 421
 pituitary 623, 625
 ponto-cerebellar 637
 prechiasmatic intracranial, of
 optic nerves 527
 primary intraneural, of optic
 nerve 406
 spinal cord 611
 Tumpeer, I. H. 89
- U**LCER, trophoneurotic of the
 foot 80
 Undernourishment and internal
 secretions. 398
 Undernutrition and endocrine dis-
 turbances 394
 Uno, T. 400
 Urechia, C. I. 88, 203,
 297
 Urticaria, giant 79
 Uyeno, K. 198
- V**AGUS, motor nuclei of.... 514
 nerves, distribution of to
 sinoauricular junction of
 the mammalian heart.... 391
 Valley, Aldabalde D. R. 294
 van Londen, D. M. 421
 Van Westrienen, A. F. A. S.... 295
 Varicella and herpes..... 84
 Variot, G. 296
- Vascular spasms, treatment of by
 sympathectomy 617
 Vasodilator mechanisms 514
 Vasomotor reflex from aorta... 618
 Vegetative system and individ-
 uality 71
 Veiel, W. H. 389
 Vendel, S. N. 624
 Verhoeff 406
 Vernet 314
 Vertebral bulbar hemisyndrome. 639
 Villard, H. 626
 Villinger, W. 648
 Vincent, C. 636
 Vincent, S. 399
 Visser, John F. 652
 Vision, theory of 627
 Visual defects and occipital lobe
 lesions 630
 Vocational maladjustment, af-
 fective factors in 653
 Vollmer, H. 394
- W**AGNER-JAUREGG.... 312,
 401
 Waldorf, C. P. 625
 Walter, G. S. 209
 Walking, difference between mus-
 cular and neuromuscular in-
 terpretation of 416
 Walter, K. 204
 Warnock, Fanny 636
 Wassermann survey of inmates. 203
 Webster, W. J. 410
 Weed, L. H. 533
 Weigelt, W. 301
 Weinberg, Max H. 611
 Weinberger, W. 204
 Westerman-Holstijn, J. 647
 Weston, P. G. 433
 White, E. P. Corson..... 192
 White, William A. *1, *246
 Whitehorn, J. C. 438
 Wiborg, A. 82
 Wightman, S. D. 514
 Wile, V. J. 83
 Williams, B. W. 299
 Williams, C. B. 77
 Willins, F. A. 518
 Winkelman, N. W. *593
 Witthauer, W. 525
 Woodwell, M. N. 320
 Wright, C. S. 83
 Wright, R. E. 404
- X**ANTHOCHROMIA due to
 acute, purulent, spinal men-
 ingitis 637
- Y**ERGER, C. F. 639
 Young, G. 405
- Z**ADEK, I. 195
 Zak, E. 618
 Zappert 428, 646
 Ziehen, T. 640
 Zona, motor disturbances after.. 633

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TABLE OF CONTENTS ON PAGE II

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TABLE OF CONTENTS

ORIGINAL ARTICLES

Somatic Pathology and Psychopathology at the Encephalitis Crossroad: A Fragment. By Smith Ely Jelliffe, M.D., Ph.D.....	561
On the Nature of Abdominal Reflexes. By M. Astwazaturow, M.D.....	587
Extensive Brain Hemorrhage. By N. W. Winkelman, M.D., and John L. Eckel, M.D.....	593

SOCIETY PROCEEDINGS

New York Neurological Society.....	603
Human Epidemic Encephalitis in Rabbits; The Pupil in Somatic and Visceral Disorders in Association with Referred Pain and Hyperalgesia; Unusual Types of Spinal Cord Compression; Spinal Cord Tumors.	

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY

- 1. Vegetative Nervous System:** Oppel, V. A., Gangrena Arteritica Suprarenalis (615); Crile, Dennis W., Resuscitation by Intra-Cardiac Injections (615); Foster, Nellis B., Relation of Hypertension to Cardiorenal Diseases (616); Leriche, R., Periarterial Sympathectomy (616); Brüning, F., Periarterial Sympathectomy (617); Forestier, J., Treatment of Vascular Spasms by Sympathectomy (617); Gilbert and Coury, Sympathicotonia in Tachycardia (617); Claude and Oury, Nervous Manifestations in Endocarditis (617); Liebesny and Scheminzky, Plethysmography and the Heart (618); Engelen, P., Blood Pressure Findings After Beer Drinking (618); Zak, E., Vasomotor Reflex from the Aorta (618); Kelling, G., Gallstones and Migraine (618).
- 2. Endocrinopathies:** Büchler, P., Hypophysis and Diencephalon (619); Dudley, H. W., Active Principles of Pituitary Gland (619); Tucker, Recovery from Diabetes Insipidus (620); Roggen, A., Myxedema and Pituitary (620); Perrin, Hanns and Stefanovitch, Hemostatic Action of Pituitary Extract (620); Léopold-Lévi, Minor Pituitary Syndromes (621); Drummond, J. C., and Cannan, R. R., Tethelin (621); Cross, Ernest S., Clinical Study of a Patient Suffering from Intense Thirst and Polyuria (621); Lissner, H., Hypopituitarism (622); Lereboullet, P., Role of the Pituitary and the Pineal Bodies in Infantile Dystrophy (622); Blumberg, Roentgen Irradiation for Hypophyseal Tumors (623); Kotschalowsky, M., and Eisenstein, A., Pituitary Tumors (623); Vendel, S. N., Pituitrin in the Treatment of Herpes Zoster (624); Serdinkoff, M. G., Influence of Pituitary on Bladder (624); Bailey and Bremer, Experimental Researches on Diabetes Insipidus (624); Waldorf, C. P., Pituitary and Inner-Brain (625); Sainton, P., and Schulmann, E., Pituitary Tumor (625); Camus, Jean, and Roussy, Gustave, The Pituitary Gland and Its Syndromes (625).

II. Sensori-Motor Neurology

- 1. Cranial Nerves:** Villard, H., Optic Neuritis of Dental Origin (626); Green, Eldridge, The Theory of Vision (627); Gifford, Sanford R., Newer Views in the Treatment of Optic Atrophy (628); Gourfein-Welt and Redaillé, Superior Quadrant Hemianopsia (629); Moore, Renal Retinitis (630); Scarlett, H. W., and Ingham, S. D., Visual Defects and Occipital Lobe Lesions (630); Stieren, Edward, Neurofibroma of the Orbit (631); Amat, M. Martin, Ophthalmoplegic Migraine Neuralgia (631); Sachs, B., Shall We Decompress for Choked Disk? (632); Reeder, Wm. G., Ethmo-Sphenoidal Disease and Retro-Bulbar Neuritis (632).
- 2. Peripheral Nerves:** Fraga, C., Etiology of Beriberi (632); Süderbergh, G., Motor Disturbances After Zona (633); Targowla, R., The Cerebro-spinal Fluid in Herpes Zoster (633); Marinesco, G., Herpes Zoster (633).
- 3. Spinal Cord:** Farnell, F. J., Intravenous Administration of Iodides (634); Kerppola, W., Differentiation of Spinal Cord Affections (634); Jackson, H., The Circulation of the Cerebro-spinal Fluid (634); Dible, J. H., Colloidal Benzoin Reaction in the Cerebrospinal Fluid (635); Dubreuil, G., Histophysiological Conditioning of the Sense of Tactile Pain (635); Vincent, C., and Bernard, E., New Kind of Paraplegia (636); Warnock, Fanny, Colloidal Benzoin Reaction of Cerebrospinal Fluid (636); Johns, F. M., Correlation of Blood, Spinal Fluid and Clinical Findings (636); Horrax, Gilbert, Xanthochromia Due to Acute, Purulent, Spinal Meningitis (637).
- 4. Midbrain, Cerebellum:** Gordon, A., Ponto-cerebellar Tumors with Few Symptoms (637); Rossi, G., Removal of Portions of Cortex Cerebelli after Interruption of Circulation (638); Hawthorne, C. O., Cerebral & Cerebellar Hemorrhages (638); Rebattu and Gardère, Traumatic Meningeal Cyst of the Left Cerebellar Lobe with Quadriplegia (638); Yerger, C. F., Otic Abscess of the Cerebellum (639); Dide and Peyton, Bilateral Pontine Syndrome (639); Marinesco and Draganesco, Vertebral Bulbar Hemisindrome (639); Dandy, Walter E., Tumours of the Cerebello-Pontine Angle (639).

III. Symbolic Neurology

- 1. Psychoneuroses:** Schenk, P., Neurological Mistakes (640); Lee, M. A. M., and Kleitman, N., Studies on the Physiology of Sleep (640); Ziehen, T., Psychology and Medicine (640); McCracken v. Swift & Co., Physical Versus Mental Suffering (641); Frank, Psychology of Starving People (642); Richet, C., Extrasensorial Channels of Knowledge (643); Kuffner, K., Medico-legal Significance of "Hypnosis" (644); Aschenheim, E., Psychic Inanition of Infants (644); Pfister, O., Plato: A Forerunner of Psycho-Analysis (644); Ferenczi, S., the Symbolism of the Bridge (645); Zappert, J., Neuroses in Children (646); Friedjung, J. K., Environmental Types of Preadolescence (646); Günther, H., After Sensations, Especially Sensory Iterations, Also Sensory Refraction Phases (647); Westerman-Holstijn, J., Analysis of Torticollis (647); Koster, S., Hypnosis in Treatment of Neuralgia and Neuritis (648); Villinger, W., Are There Psychogenic, Non-Hysterical Psychoses upon a Normally Psychic Foundation? (648); Mitchell, T. W., Psychotherapeutics and Psychopathology (649); MacKenzie, Functional Paraplegia (651).
- 4. Medico-Legal; Social:** Visser, John F., A Study in Constitutional Psychopathic Inferiority (652); Hildebrandt, F., Metabolic Changes Following Chronic Morphine Poisoning (653); Prouette, L., and Fryer, D., Affective Factors in Vocational Maladjustment (653).

BOOK REVIEWS	655
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DIRECTORY FOR PRIVATE INSTITUTIONS

Alhambra Sanatorium.....	21
Anderson, Christian S., Hot Springs, Va.....	19
Anderson, Dr. P. V., Richmond, Va.....	12
Anderson, Dr. V. V., Shrewsbury, N. J.....	19
Balley, Dr. B. F., Lincoln, Nebraska.....	16
Barnes, Dr. F. H., Stamford, Conn.....	12
Belle Mead Farm Colony and Sanatorium, Belle Mead, N. J.....	6
Bournewood, Brookline, Mass.....	14
Brooks, Dr. Swebson J., Rye, N. Y.....	21
Brown, Dr. Sanger, Kenilworth, Ill.....	13
Brown, Dr. Sherman, Kenilworth, Ill.....	13
Caples, Dr. B. H., Waukesha, Wis.....	16
Capron, Dr. A. J., Owego, Tioga Co., N. Y.....	14
Carrol, Dr. R. S., Asheville, N. C.....	18
Cavender, Dr. W. M., Shrewsbury, N. J.....	19
Channing Sanitarium, Wellesley, Mass.....	6
Cincinnati Sanitarium.....	11
Cook, Dr. R. H., Oxford, O.....	15
Dold, Dr. William Elliott, River Crest, Astoria, L. I., New York City.....	16
Easton Sanitarium, Easton, Pa.....	19
Fair Oaks, Summit, N. J.....	12
Gayle, Dr. E. M., Richmond, Va.....	12
Givens, Dr., Sanitarium, Stamford, Conn.....	20
Glenmary Sanitarium, Owego, Tioga Co., N. Y.....	14
Green Gables, Lincoln, Neb.....	16
Hall, Dr. J. K., Richmond, Va.....	12
Hammond, Dr. William J., Westwood, Mass.....	13
Hartford Retreat, Hartford, Conn.....	12
Highland Hospital, Asheville, N. C.....	18

(Continued on page XVII)



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Interpines, Goshen, N. Y.....	18
Kellogg, Dr. T. H., Riverdale, N. Y.....	20
Kenilworth Sanitarium, Kenilworth, Ill.....	13
Kidd, Dr. R. A., Columbus, O.....	18
Kittredge, Dr. C. A., Beacon, N. Y.....	20
Livermore Sanitarium, Livermore, California.....	11
Marshall Sanitarium, Troy, N. Y.....	20
McFarland, Dr. D. W., Green's Farms, Conn.....	20
McFarland, Dr. D. W., Hastings-on-Hudson, N. Y.....	6
McIntosh, Dr. J. A., San Antonio, Tex.....	16
MacMillan Sanitarium, Columbus, O.....	18
Millsbaugh, Dr. D. T., Paterson, N. J.....	19
Milwaukee Sanitarium, Wauwatosa, Wis.....	6
Moody, G. H., Dr. Moody's Sanitarium, San Antonio, Tex.....	16
Moody, T. L., San Antonio, Tex.....	16
Norbury Sanitarium, Dr. F. P. Norbury, Jacksonville, Ill.....	14
Oconomowoc Health Resort, Oconomowoc, Wis.....	14
Orchards, Stamford, Conn.....	14
Oxford Retreat, Oxford, Ohio.....	15
Patterson, Dr. C. J., Troy, N. Y.....	20
Podstata, Dr. V. H., Livermore, California.....	11
Prout, Dr. T. P., Summit, N. J.....	12
River Crest, Astoria, L. I., New York City.....	16
Riverlawn, Paterson, N. J.....	19
Riverview Home, Beacon, N. Y.....	20
Robertson, Frank W., M.D., Stamford, Conn.....	20
Robinson, Dr. G. W., Kansas City, Mo.....	11
Rogers, Dr. A. W., Oconomowoc, Wis.....	14
Rosanoff, Dr. Aaron J.....	21
Ruland, Dr. F. D., Westport, Conn.....	18

(Continued on page XXI)

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Seguin School, Orange, N. J.....	18
Seward, F. W., Goshen, N. Y.....	18
Sleyster, Dr. Rock, Wauwatosa, Wis.....	6
Somerville, Wm. G., M.D.....	12
Spring Hill Sanitarium, Hastings-on-Hudson, N. Y.....	6
Spruces, Shrewsbury, N. J.....	19
Stamford Hall, Stamford, Conn.....	20
Stedman, Dr. H. R., Brookline, Mass.....	14
The Pines, Oxford, O.....	15
Thompson, W. N., Hartford, Conn.....	12
Torney, Dr. G. H., Brookline, Mass.....	14
Uniker, T. E., Stamford, Conn.....	14
Virginia Hot Springs, Hot Springs, Va.....	19
Wallace Sanitarium, Memphis, Tenn.....	12
Wallace, Walter R., M.D.....	12
Washburne, Dr. G. F., Hastings-on-Hudson, N. Y.....	6
Waukesha Springs Sanitarium, Waukesha, Wis.....	16
Westbrook Sanitarium, Richmond, Va.....	12
Westport Sanitarium, Westport, Conn.....	18
Westwood Lodge, Westwood, Mass.....	13
Wetmore, S. S. P., Easton, Pa.....	19

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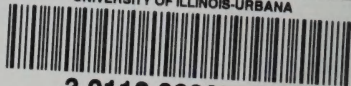
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